Galaxy

MAGAZINE
SCIENCE FICTION

OCTOBER 1968
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The Villains
from Vega IV
by
H. L. GOLD
and
E. J. GOLD

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HE WARBOTS
istory of Combat
rom 1975 A.D.
o 14,750 A.D.

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A New Science
ction Novelette
by
HRISTOPHER
ANVIL

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Behind the
Sandrat Hoax

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FOR YOUR
FORMATION

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nember the Orbit
of Explorer I?
by
WILLY LEY

CK REYNOLDS

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GIS BUDRYS

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RIS NEVILLE

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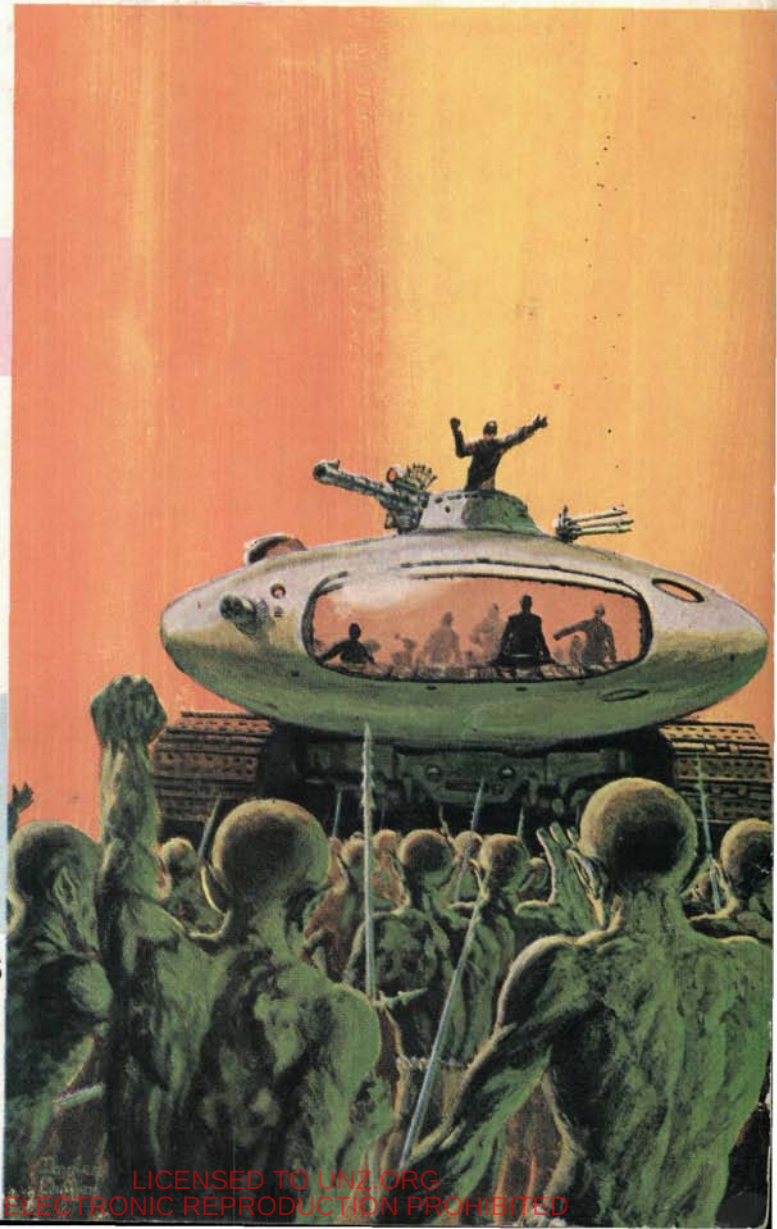
nd many more



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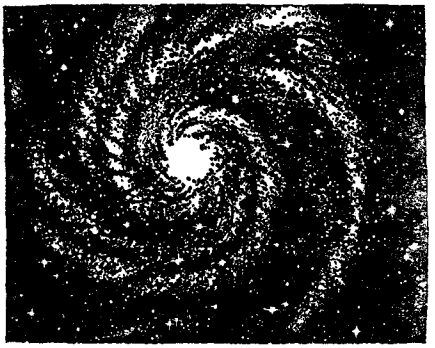

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Majority Rule

A hundred and ninety-two years ago the United States was born after a revolution aimed largely at the end of "taxation without representation." The colonists did not suffer very gravely under English rule in any tangible terms; where they suffered was in the galling sense of being unable to decide their own destinies. Wherefore this republic was formed, in an attempt to establish "government of the people, by the people and for the people."

The presidential election campaign we are now going through is one of the mechanisms designed to attain that idealistic goal. It was an astonishingly radical innovation. Nobody thought it would work. Nations had elected their rulers before, but never on such terms as these: never rulers whose powers were so strictly defined by a Constitution and whose terms of office were so dependent on the continuing confidence of the voters. Above all, never before had an electorate been so large; if it did not include women, or slaves, or more most of the propertyless, it did include most adult males. It was so radical that it dismayed even most of the framers of the Constitution, who hedged their bets with the Electoral College, hoping that some moderating influence might keep the voters from electing a tyrant or an adventurer.

Question is, do these institutions still work as they were intended, two centuries later?

When the Constitution was written, Philadelphia was a two-day stagecoach journey from New York, the city of Washington did not exist, the communications between, say, Savannah on the south and New England on the north were chancy and slow. Even when there were thirteen states, no President was able to campaign in all of them.

Witness the 1968 election. Every candidate, after the nominations and before, has been on constant view before every voter interested enough to turn on a TV set. The vote itself will be as rapidly reported as the networks think the public will stand for — they will know, by computer projection, the results from every state half an hour after the polls close; They will know the results in some states hours *before* the polls close. It takes only a relatively small sample to give a computer enough to make a projection.) That

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sample can come from as few as a dozen machines.

What slows things down is the interposition of human beings between machine and machine—a dozen or more election board workers, poll watchers, party officials in each polling place painfully recording the count. The machines are fast and reliable. The human beings are slow and sometimes otherwise.

Race tracks do the thing better. There may be 200 parimutuel windows to receive bets, but each sale at each one of them is automatically counted, added in, relayed to a central information file; odds are computed and payoffs announced on electric displays in a matter of seconds. It would be no trick to design a tree of such information-handling networks which could count every vote in the nation as soon as cast, and announce totals instantly.

There are limitations, to be sure. One would be in the handling write-in votes. (But how often do write-ins affect a Presidential campaign?) It would seem that a little engineering could overcome most of the limitations rather easily.

And if it couldn't, is there any imaginable drawback to an instant automated counting of popular vote that is potentially more dangerous than, say, the chance of the wrong man being elected through our antiquated Electoral College system?

It would be only a step, obviously, to an automatic in-the-home voting machine which could let all of us vote on all major decisions at any time. On theoretical considerations, it might even be a good idea. After all, in theory our "representatives" are supposed to make the decisions the majority of us would make it we were consulted. Why not cut out the middleman and let the electorate declare war, approve the appointment of Supreme Court justices, levy its own taxes and in every other way conduct the affairs of government itself, by instant electronic referendum?

The objection to the scheme is that we might be stampeded. And probably we would be, often enough.

But the phenomenon that made our predecessors revolt against England is not unknown today. Large numbers of Americans feel as little represented in their government as any Boston Tea Party agitator did. Considering how easily modern technology could give us representation, it seems a shame to cling to a system designed to fit into the technology of an age two centuries dead. —THE EDITOR

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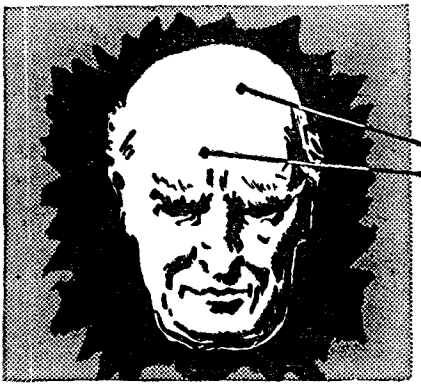

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THE VILLAINS FROM VEGA IV

by H.L. GOLD AND E.J. GOLD

Illustrated by GAUGHAN

Those desperadoes from outer space were too slick for a simple android like myself — or maybe too stupid!

I

I knew it! I knew it! I knew something like this would happen when they promoted me from Andycop to Andytec! "Give me an erratic robot or berserker android," I'd told the Commissioner — a *human* — "and nobody on the Force could subdue them faster or with less fuss. *Please* let me stay on their sublevels!" And he'd said, "Sorry. Too many years in grade. Besides we need an Andyphilo, and they're all on assignment, so you are it." I opened my mouth to argue, but he said, "One more word and it's back to the Vat. Don't worry. You'll do fine."

Fine, huh? According to the specs, Robert E. Li, President of Vega IV, was nasty, impatient, cantankerous and argumentative — in other words, a typical Frontier Outworlder VIP — and

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I, a hard-fisted hard-mouthed bull, had to keep him happy while finding his runaway bride. If that isn't a Vat situation, what is?

"Besides," added the Commissioner, "you'll have use of an official antigrav car. That make it any better?"

You bet it did. I'd never been in one, but naturally I'd been trained in its use. Now if only I could control my mouth and fists . . .

I got up to the top of Bosyorkdelphia's dome, where the starships unloaded their passengers and freight, purposely early. Why give President Li something unnecessary to complain about?

After the service sublevels, the top of the dome was quite a sight. I was still taking it in when Li's shuttle module came down and floated to a stop. He was the first off, flanked by two stewardesses, each carrying a suitcase. Maybe I do lack gonads, but I enjoy looking. They were something to look at. They led him to the Purchasing booth, where he and the man in the booth seemed to have an argument before both nodded and the suitcases were turned over. The man gave Li a credit card and the stewardesses brought him to Customs — it was the only way out, so he had no choice.

If I hadn't studied Li's Bertillon specifications, I would never have spotted him in that crowd. Pretty nondescript — about six-six, 250 pounds, tea-colored complexion, straight black hair, blue eyes, nothing to distinguish him from any other Outworlder from his sector, except maybe that frosty look Very Important Outworlders develop when they've just arrived on Earth, determined not to be impressed.

He handed his passport to the clerk, who studied it only a moment. "The 'E' is for 'Eagle,'" Li explained proudly.

"Very interesting, Mr. President," the clerk said. "You may pass through the gate."

"Just a minute," said Li. He put two items on the desk. "I want to declare my Bird of Perdition — commonly known as a BoP — and a high silk hat."

"You don't have to declare anything." The clerk was obviously used to all kinds of nutty life-forms. "You have diplomatic immunity."

President Li looked defeated for a nanosecond, and then he asked the clerk if he had even seen a BoP. The clerk told him no, he hadn't, but there wasn't time, and he pointed to the line behind Li. I saw that this was a good time to introduce myself, so I tapped Li politely on the

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shoulder. He whipped around, ready to jump down my throat, probably figuring I was a terminal guard going to ask him to move on.

"Excuse me, Mr. President," I said quickly. "I am Andytec, your android detective and bodyguard." Nothing there to offend, but he looked at me real sourly. I plowed on. "All us androids are called Andy, a custom which dates from the Third or Fourth World War — or maybe the Second — when all North American soldiers were called Joe, all British soldiers called Tommy, and all Negroes were called George. As a matter of fact, the custom may date even farther back, to the time when—"

"All right!" he roared. "I get the picture, Andy, and I'm sure you're quite learned on the subject.

Now that posed a problem. I *am* pretty good at android history, which is my hobby, but did he want me to go on or was he roaring because he'd heard enough? You can never tell with these Outworlders. I decided to drop the subject. Besides, I wanted to get on with the investigation. The faster we found his runaway bride, the sooner I could sack out at the Precinct.

"You requested a detective-bodyguard, Your Excellency, to help you find your wife."

"I know, I know. Let's get going."

Herding him out of the spaceport atop the city's dome, I could see he was trying hard not to goggle at the sights. When he was in the antigrav car, he said, very definite, "You've probably been wondering why there are so many Vegan presidents coming to Earth."

I couldn't lie, could I? "No, sir, I haven't."

"It's because whenever a newlywed couple decides to honeymoon on Earth, the bridegroom is made president and given a few suitcases of enzymes to pay expenses."

"Yes, sir," I said. "I studied up on it."

"Oh. Well, would you like to see my Bird of Perdition — my BoP?" he all but demanded.

"Not particularly, sir," I admitted.

He looked annoyed, so I explained how we androids have only very specialized curiosities, and mine didn't include BoP's.

"Well, damn it," he exploded, "you're going to see one now! Blasted passengers on the ship might as well have been androids for all the interest they showed in it."

He opened the small carrying case, and I heard a maniacal scream: "Murder! Murder most foul."

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Well that was my line of work, but Vega IV is out of my jurisdiction. BoP's are known all over the civilized galaxy as the consciences of Vegans, who force criminals to carry these BoP's around with them. They have so few people that they need every hand, so locking them up would be wasteful. Did that mean President Li was a criminal? I figured that was his problem, not mine, and I sure wasn't going to antagonize him by asking.

"Assassins!" the thing was shrieking. "Thy hands reek with the smell of blood!"

"Pay no attention to it, Andy," Li said. "BoP's are raised on a diet of Gothic literature." I guess he thought that explained everything. It probably would, if I knew what Gothic literature was. "But," he continued, "they're better company than someone who keeps saying, 'I know, sir,' or 'Androids have specialized curiosities, sir.'"

He was pretty red around the gills — I don't mean he had gills, though he could have, of course, but where gills would have been if he'd had any.

"I'm sorry, Your Excellency," I said in a rush, remembering what the Commissioner had said about the Vat. "I'll try to be more curious about the subjects you wish to discuss."

'That's better."

If we don't, I thought, I've had it. I wished I was back on my old beat on the android and robot slidewalks in Flabbush.

"You'll notice, Andy, that the BoP has suction cups instead of feet. Also, it has the body of a lion, the wings of a hawk and the head of a woman, although its overall length is only six and a half inches. It is artificially bred through intense genetic manipulation."

Hell, so was I. But I said, "Very interesting, Mr. President."

"You might at least *look* interested," he snapped.

So I bugged my eyes out and leaned over the carrying case. "Yes, *sir!*" I said, wondering what to say next. A thought came to me. "About your wife, Your Excellency — have you brought along her Bertillon specifications?"

"You blathering son of a test tube!" he howled. "Do you think I'd come all this distance without a copy?"

"No, sir. I'm sorry, sir. I was just making conversation," I said, plus a lot more of the same, till he calmed down and handed me the card. I stuck it into the car's dataphone slot, waited a second, then handed it back.

By then he was off on another subject. "What do you think my wife's chances are of getting into 3V, Andy?"

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I explained as tactfully as I could that her chances in 3V were zero. For some reason, that seemed to cheer him up. But then I added that if she was in acting, she would be doing Off-Broadway. "That's live," I added, "in a theater."

"I know. But which one?"

I told him that Bosyorkdelphia was the theater capital of North America, with almost a dozen theaters. But locating her would be relatively easy, if acting was really what she had in mind. It would only be a matter of hours.

"That's fine, Andy," he said, relaxing. "Take me to my hotel. I'm bushed."

"Yes, sir. Which hotel, sir?"

"The Sheraton - Statler - Hilton Trenton."

"Do you have a reservation, sir?" I asked, and was immediately sorry.

"You idiot, do I look like an incompetent? Of course I have a reservation!"

I decided not to try to get into any more conversations with this twitch if I could help it. When clearance was issued, I guided the antigrav into the police lane and punched in the hotel's code.

Li coughed to break the silence. I could see he was getting his jaw cranked for another informative talk. "I don't suppose you know the colonizing expedition to Vega IV was about as racially mixed as an expedition could be," he said, looking at me sideways to see if I was going to say I knew or wasn't interested. But I'd learned my lesson. I nodded contents-noted-and-waiting-for-more. "That was long before the city domes were built, when there was a lot of travel between cities and intermarriage. Speaking of which, on Vega, we have *marriage!* You've probably been wondering what our customs are in that respect."

Well, I don't know three humans who would have wondered about it, much less an android, but I said that *had* been on my mind. So he told me that this was his second wife. Li was 36, and she was 18. When she got to be 36, she'd marry an 18-year-old boy.

"You can see, Andy, that a 36-year-old man is ideally suited to an 18-year-old girl, and an 18-year-old boy and a 36-year-old woman are also perfectly matched. When we Vegans are 54, we can marry anyone we please. I can't wait; then my girl from high school and I are going to get married. She's the only one for me — when we're 54, of course. I see," he said, leaning toward the side of the antigrav car and pointing down, "that Earth buildings don't have windows."

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"That's right, Mr. President," I said. "They stopped building with glass and such since the Great Crash, Black Wednesday, October of 2929." I wondered if I ought to tell him how the marriages of Earth were arranged by computer.

"How are marriages here on Earth arranged, Andy? I don't see how couples could meet."

So I told him.

"Why the devil don't you tell me these things without my having to ask?" he demanded. But the BoP had heard "Great Crash" and was shrieking, "O dire destruction! Death stalks the streets! Life's but a passing shadow!"

I guess I knew what Gothic literature was like then. Luckily, the closed carrying case muffled the fingernail-on-blackboard shriek, or there might have been an interplanetary incident.

I put the antigrav down on the hotel roof, and we were met by the manager and some Andyhops who looked hopefully for something to carry.

"Ah, President Li, it is indeed an honor to have you here as Earth's guest," said the manager. "Your suite is ready. Have you left your luggage at the spaceport?"

"No. I only have my BoP — my Bird of Perdition — and a high silk hat. Would you like to see the BoP?"

"Not particularly, sir. We androids have only limited — "

"Forget it. I suppose I call you Andymanager?"

"Andyexec, sir. Right this way."

We walked past the disappointed Andyhops, who stood by muttering things about people who don't have luggage. Li just stared at them.

When we got out of the antigrav tube and the manager grandly threw open the door of the Presidential Suite, I reeled back at such luxury — *two* rooms and a bath and a *half!*

"Naturally, sir," the manager was saying, "the crowded condition of Earth makes the use of more than one room by an individual economically unfeasible, but at the same time, sharing a room with someone else would be psychologically unsound. If you lived on Earth, you would appreciate the One-man, One-Room plan." He waited for some gasp or something from Li, but Li wasn't impressed. "Now you'll want to know how to operate the electronic doors," the manager went on bravely, showing Li the thumb lock as we went inside the suite. "And you turn the lights up or down here. This is to change channels on the 3V wall, and here — " he made an

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elaborate show of pushing a button — "is the sink. You press this button and tell the sink what water temperature you want. If you get lonely in the shower, which is very usual for an Outworlder, you'll find the shower an uncommonly good conversationalist. If you get hungry — "

"What do you take me for — some kind of yokel from a hick system?" Li shouted at him. I could see it had been working on the man's nerves for a while. "I'm from Vega, the most progressive planet in the galaxy!" He would have gone on, too, but the manager was backing out, with a sympathetic nod in my direction.

"No, Your Excellency. Yes. Mr. President. But you'll want to know that the airform bed is concealed in the floor. I'll raise it for you. Oh, Murphy!" And the bed whispered into shape, and the door closed behind the unruffled manager. Damn, I wished I had his aplomb, if that's the right word. But then he'd had lots of experience with humans, Outworlder and otherwise, and this was my first — and probably last — experience.

Li was talking into the visiphone: "Spaceport? This is Robert E. Li, President of Vega IV. I want reservations for three on the midnight flight to the Vegan Sector."

"Tonight, Mr. President?"

"Tonight, Mr. President?" asked the female Andyop.

"That's right," Li told her.

Three? I asked myself. Who could be going back with him? His wife, sure — *maybe*. If he could talk her into it. But who was the third?

I heard Li asking, "How did he say you change the channel?" I showed him, and he fiddled with the selector, found an old quiz show and settled back on the airform bed. I stood around, wondering what he thought he needed a bodyguard for. Li let the BoP out of the carrying case, and the thing stretched, flew down clumsily to the floor and waddled over to the 3V and sat there, watching it.

I called PoliCentral on the land line. They told me where Li's wife was — at the Off-Broadway YWXA. I relayed this to the Outworlder.

"X?"

"Yes, Mr. President. Interracial."

"Really? I thought it stood for Xenophobia."

"No, sir. Shall we go?"

"As soon as this contest is over, Andy. I want to see who wins the washing machine, refrigerator and automobile."

"Those people have been dead

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for centuries," I told him. "That's an old videotape; they're competing for things that have no Earthly use."

"Maybe so," he answered. "But don't you like games?"

"I don't know, sir. I've never been in one."

He sat up suddenly. "Nuts! I was hoping the couple with eyeglasses would win. I never saw anyone who wore eyeglasses." Of course he hadn't; visual defects are corrected at birth. I explained that to the President, but he only said he knew that, as usual.

"I'm sorry, sir. I'm really trying."

"Very," he said nastily, and was asleep with the abruptness of a tropical night in the 3V production of *Rain*.

II

The 3V exploded, and Li fell off the bed, while the BoP was stuck onto the screen and yelling, "Murder most foul!" again, in its normal conversational shriek. Its suction cups were plastered over the head of a tank commander who was shouting, "Be liberated or die!" to a mob of half-naked green men standing around with spears in their hands.

The tank sent another round over the green men, and it went off behind us. This time Li was awake. He peeled the screaming BoP off the 3V wall with a loud plopping sound and put it back in its carrying case.

"Turn that bloody thing off!" he shouted at me.

"Off, sir?" I said vacantly. "You can change channels and make it louder, but you can't turn it off. With the 3V off, what would there be to do? And it would be so lonely."

Li sat on the edge of the airform bed, shaking his head and looking disgusted. "Hairless green men with pointed ears, for Peter's sake!" he said more to the 3V than to me. "These pre-interstellar movies — how unimaginative can you get? Couldn't they have guessed there would be crawly, slithery, creepy things? Giant brains encased in glassite? Rock-eating things with springs for feet? Bah!"

I picked that moment to get in a little information. "While you were asleep, sir — "

"Me, asleep?" he roared. "I was just resting my eyes!"

"Yes, sir. While you were resting your eyes, I had four hourly bulletins on Mrs. Li. Headquarters says she's going under the alias of Lyla Lyons, and she has a part in a revival of that grand old whodunit, *The Pool of the Moon*, by Clyde Crane Campbell. It's due to open tonight, as a matter of fact, at 8:30. *Now* can we go?"

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"Depends. What time is it, and where's the theater?"

I told him it was nearly 6:00 and the theater was uptown, in the Providence Plantations.

"No wonder I'm hungry," he said, studying the hotel menu. "Steak and potatoes okay with you?"

I said fine, and he punched the appropriate buttons. Out came two trays that he looked at unbelievingly.

"People *eat* this mush?" he demanded.

"Well," I said diplomatically, "it's not the Empire State Restaurant — "

"All right, we'll go to the Empire State Restaurant."

I was willing, of course. I'd heard about the place, but I never could afford it. It has a hundred and two different floors, each with its own atmosphere and gravity, for any kind of extraterrestrial you could name. And it cost a fortune. Li could afford it; he'd sold his suitcases of enzymes, and I was on his expense account.

We were about to leave when the 3V announcer started talking about the news. Li sat down again and listened to it straight through to the sports and weather, then looked at me, puzzled.

"That doesn't make sense, Andy. With the city domes, why would anyone care about the weather?"

But the newscaster answered for me: "And that's the way it was, for Wednesday, February 14, 2541."

"Very interesting for the people who lived then," Li said nastily. "What about *today's* news?"

"We don't have any, sir," I said, and explained to him that the old jokes about Earth were true — that nobody bothered to make new tapes and films because there were so many old ones, and they were all that was played on the 3V. "Besides, it's nice to know how it all came out," I finished.

"Too bad, Andy. Now, on Vega, we have *weather!*"

"Do you have seasons, sir?" I asked.

"We sure do. Growing and freezing."

I was going to tell him about Earth's seasons, but I checked myself. Would he be interested in the fact that Earth used to have so many seasons? Probably not, I decided.

"I understand Earth used to have a number of seasons, Andy. That true?"

Wrong again. "Yes, Mr. President. There was spring, summer, Indian summer, autumn, fall and winter."

Li was impressed all right. With the rollcall of the seasons

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thundering in his ears, his two measly seasons went off begging for company. He snatched up the BoP's carrying case and the high silk hat and burned all the way up to the lobby on the top floor. He gave the clerk his thumbprint and told him he was checking out.

"You're not coming back to the hotel, Mr. President?" the Andyclerk asked disappointedly.

"I came here to find my bride and I'm taking her home tonight."

Her and who else? I asked myself. But I could see my luck changing. Soon the assignment would be over, and I wouldn't have to keep trying to get along with this venomous Vegan. The BoP kept up a rail of muffled complaints all the way to the antigrav, because Li, in his foul mood, bumped the carrying case with his leg every other step.

The Empire State Restaurant was in the E.T. Quarter, on 34th and Fifth Avenue, so I punched that in and settled back, quietly enjoying the effect on Li of that six-season haymaker.

The E.T. Quarter is noted for its elegance and subdued noise level. The equivalent of middle-aged couples were creeping, slithering, hopping and flapping — the equivalent of strolling — most of them in their equivalent of spacesuits, with Rigellian-made cameras. Very nice neighborhood.

So when we suddenly got shot with a tangle gun and clubbed from behind, I wasn't even ready.

I guess I came to a minute or so before Li, who came out of it fighting. I yelled at him to stop struggling or the tangle would get even tighter. The tangle, which is an anti-riot viviparous plant from Aldbaran or thereabouts, increases its grip when you fight it. I used to carry one all the time; now, when I needed one, I didn't have it. That's diplomatic service for you.

Of course whoever shot and clubbed us wasn't around any more. But the equivalent of middle-aged couples were doing the equivalent of strolling around and past us. I tried to get them to stop and help us, but they all looked skyward, across the street, anywhere, just so they wouldn't see us. An Earthwoman came by — small, dumpy, in her late eighties, I'd say.

"Young lady," I called out, "we're caught in this tangleweed. See that little bulb? The web will retract if you push the tangle's belly-button. Would you push it, please?"

"I don't know what you mean," she said, and walked off.

A man had paused and listened and was about to leave when

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I said in my best sublevel voice, "I'm a detective on official business. It is your duty as a human citizen to free me and this gentleman here, who is the President of Vega IV. Now *move!*"

The guy looked very unhappy. "I don't want to get involved."

"You won't be," I said. Li was getting madder and madder, and we were both pretty hungry. "My I.D. is inside my jumper, breast pocket, and let's hurry up about it!"

He shoved his hand into my jumper — and the tangle grabbed him by one arm.

"Sorry," I said. "Now let's nobody move till I figure a way out of this mess." I thought a while, till I had it. "It's easy," I told them. "Now you've got one arm free, mister. Keep it clear while I put my left leg over your right shoulder. Then grab hold of my belt and haul yourself up, and you'll be in position to push the tangleweed's belly-button."

So I got out, released Li and turned to thank the human, but he was running by then and got lost in the crowd.

"Please don't tell the Commissioner that I talked to a human as if he were an android or robot," I begged Li.

"And what do I tell him about you letting us get tangled and this knot on the back of my head?"

I groaned silently. Another goof like this and it *would* be back to the old Vat.

III

In the Earth Room of the Empire State Restaurant, only one table was occupied. A young couple was sitting at it. Li barged over to them and asked if they minded our joining them.

The guy looked up at him. "Well, it was sort of our honeymoon — " But Li had already sat down. I sat down, too, remembering my prime directive: not to antagonize Li.

"Good evening, sir and madam," the menurobot in the table said to us. "Welcome to the Earth Room. All Earth protein is derived from giant growing mounds of flesh that once were separate and distinct animals. We have beef, lamb and pork flavors — excellent today, I might add — plus fish and poultry flavors, and all garnished with the finest hydroponic vegetable purees. Earth has no room for food animals, or, for that matter, vegetation to sustain them or us. Even the oceans are too crowded with floating and underwater cities. We import puree enzymes directly from Vega IV."

"Hear that?" asked Li amiably. "That's me — President

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Robert E. Li of Vega IV. I brought in two suitcases of enzymes, sold them at a fancy price, so the treat's on me. What will you have?"

The pair said that was awfully nice of him and ordered drinks, and Li added one for himself and another for me. It was my very first. I found I liked the taste but not the effect.

Meanwhile, Li had been giving a State of the Planet Report on the Vegan Economy, touching lightly on the many wonders of his home planet. "And what's your racket?" he asked the man.

"Oddly enough, I'm a President, too — Canopus VII — and I've brought in our most popular product: an oil so light that it has no surface tension. One drop lubricates an entire robot and is guaranteed to outlast it."

"That good, huh?" said Li. "Sounds like just the thing we need for our reapers and threshers. Guaranteed?"

"Sheds water like a duck's back."

I wondered what a duck was, but they were praising their wares, and asking about a duck would infuriate Li — or both of them. By then, anyhow, Li had gotten around to offering his enzymes in exchange for the Canopean's oil.

"But we don't like pureed vegetables," the guy said.

"Well, it has other uses," said Li.

"Like what?"

"You'll find some use for it," Li said.

They all ordered, pork for the men and lamb for the lady, and waited for me. I ordered the fish flavor.

"Good," said Li. "I was afraid you were going to say that androids don't eat."

"Of course we eat, sir," I said to him. "The only difference between us — " his eyebrows went up — "are the lack of gonads and this brand behind my left ear that says 'Made in U.S.A.'" I showed them the small brand.

The food arrived. Li was talking to the couple about his runaway bride, and they were listening politely. I let my attention wander away from the monologue. I'd seen hundreds of tapes about the young girl with dramatic aspirations who had run away from an older husband so she could: A) join a vaudeville act; B) join the circus; C) become an overnight sensation when the star of the show could not or would not go on; D) etc. Li's spluttering brought me back to the present.

"Who'd *want* to live here and eat this miserable stuff? Liquified vegetables, unbegotten meat — and not enough of either!"

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"The fish is excellent, Your Excellency," I said, trying to calm him down. "Would you care to try some?"

Li took a quarter of my portion on his fork, jabbed it into his mouth. He chewed thoughtfully, incredulously, revoltedly; but he got it down.

"Call that fish?" he yelped. "Why, on Vega we wouldn't even *feed* it to the fish!" He ate with the grimness of an Outworlder who had to eat what he'd bagged or go hungry.

We had a lot of alkaloids on the rocks and laughed a lot and I guess I knew now what being stoned is like. However, my sense of duty remained sober and I kept urging Li to leave.

"What for?" he asked merrily. "You said yourself it was only a dull, old, 27th-century whodunit."

"It is, sir. Only I didn't say it was 27th century."

"Well, isn't it?"

"Yes, sir. How did you know, sir?"

He swatted me on the back, laughing his head off. "Don't look so upset, Andy. It's probably telepathy or just a guess."

I thought he was stalling for some reason, and he was.

"I'm not leaving here without my dessert!" he told the menu-robot. "It's included in the dinner and I want it!"

"Yes, sir or madam. What would you like or prune whip?"

"Prune whip. And don't tell me how you raised it or on what."

When he finished, we just had time to make the last act, but Li had a little trouble putting his credit card into the robot's charge slot.

"Plus 20 per cent tip, sir or madam," it said.

"What?" Li shouted. "Who for? I'll bet you're not even human. I'll bet you're just some damned servomechanism."

"True, sir or madam, I am."

"Then who is the tip for?"

"General Services, sir or madam."

"I suppose that's a bunch of robots, too."

"No, sir or madam. We are investor-owned."

"Oh." Li seemed happy with the answer. "That's different. Add your 20 per cent."

IV

We left the car on the upper levels and took the drop to the Old Street Level, where the theater was, cramped in between two tall residential buildings but lucky to have survived at all. Li bought a bouquet of paper flowers — there are no real ones anywhere, of course — from a vending machine, and we went around to the stage door, where an eld-

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erly robot accepted them for Miss Lyons.

"Stage door Johnny, eh?" it said in a cracked voice. "Can't wait back here, young feller." It lifted a metal arm and looked at the wristwatch on it. "Play'll be over in 14 minutes."

"By Joe," Li exclaimed as we went around to the front and entered, "this is more like it! Flowers, stage door, a real theater, living actors, even if the play is an old stinker — "

"Gooood even-ing," the ticket taker broke in. "Not many people attend the legitimate theater any more since the good old days. But you will be proud to know that tonight's attendance — with your arrival — has broken all records: there are 71 in the audience. That is," it interrupted itself, "if we can count you, since you did not get here until the last few minutes of the play. I guess it's fair," it decided at last. "After all, you *did* buy tickets and you *are* here. But next time, try to be more prompt. The curtain goes up at 8:30."

"I know," Li said cheerfully, and we went in, Li holding the high silk hat and the BoP's carrying case.

We made a fearful racket in the dark, bumping into seats and things. The action on stage stopped till we sat down in the last row. Li let the BoP out and explained to it — and to me, because I had no idea what was happening in the play — that all the suspects were in the room and the Inspector was summing up the case. The BoP climbed up on Li's shoulder so it could see. Li warned it that if it had anything to say, it had better whisper or he'd put it back in the carrying case. It nodded, which surprised me. I didn't know it understood that much.

"Now," the Inspector said, as soon as we got settled, "we know this much — Mr. Harold Hughes, eccentric billionaire, is dead!"

"Oh, black chasm of fearful evil!" whispered the BoP. I could see it was aching to let out a screech, but with Li glaring at it, it didn't dare.

"Furthermore," the Inspector went on, "exactly one week ago, Hughes took out a most peculiar insurance policy. Mr. Elmwood, your company issued that policy. Suppose you tell us about it."

"Well," said the artificially padded man (nobody is fat any more), "it's pretty hard to explain."

"I'll say," Li commented.

"Harold Hughes came to us in a very distraught way. He said he had a horror of drowning in the Ganges River. Now he had never been out of New York — " it was a 27th-century play, all right — "and he accepted our

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stipulation that he never would as long as he lived. Likewise, we put in the usual ban on suicide."

"One moment," said the Inspector. "Hughes bought that policy, ladies and gentlemen, with his last billion dollars, because his fortune was gone, squandered, and he was actually penniless!" Everybody sort of sat or stood around, waiting for him to continue, and he did. "Mr. Elmwood, did your company psycholize Hughes to see if his horror of drowning in the Ganges River was real?"

"We did, Inspector. It was very real. And so was his determination not to leave New York, as well as his not contemplating suicide."

"And yet," said the Inspector dramatically, "Harold Hughes did in fact drown in the Ganges River — without leaving New York!"

The cast made noises of astonishment.

"That's preposterous!" exclaimed a tall woman in a blue-gray wig. "How could my poor, lamented husband drown in the Ganges River, which is in India, without leaving the city?"

The Inspector pulled some documents from his attache case. "I have here a bill of sale from the Ganges Water Company for 20,000 gallons of Holy H_2O, a bill of lading from the Water Buffalo Associates Transport Association, a manifest from the Hog Island Tramp Freighter, and a freight bill from the Pacific Fe Railroad — all for carrying and delivering said 20,000 gallons of water of the Ganges River to the penthouse apartment of one Guru Rabindrinath Makeesh — where the devout of Makeesh's faith may bathe on appointed holy days in the guru's Pool of the Moon — and where Harold Hughes was found drowned!"

"Alack, piteous mortal!" whispered the BoP. "What craven creature did him in?"

"Psycholizing isn't all that perfect," said a youth lounging on a centuries-old couch. "Possibly dear old Dad knew about the pool and committed suicide because he wanted Mother blamed for his death."

"Evoe!" breathed the BoP. "'Twas then by his own hand!"

"If I may say so, Inspector," Elmwood put in, "that theory, in the opinion of my insurance company, holds water."

The audiance howled and clapped. Li groaned.

Elmwood bowed and continued. "Mrs. Hughes here was one-third beneficiary — and she knew it!"

"Oh, fell and wanton she-fiend!" the BoP said in a low tone that carried to the stage. I kind

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of slid down a bit when everyone in the theater turned to shush us, but Li didn't even notice. He was waiting for the play to continue, but why, I couldn't guess.

"Your company's desire not to pay up is understandable, Mr. Elmwood," said the Inspector sarcastically. "But your theory is contradicted only by the facts — namely, that Hughes suffered a fractured skull, *from behind,* and that Mrs. Hughes had no motive. She has more money than Hughes ever owned. What's more, she loved him and they often argued about money, she offering to help and he refusing to live off a woman. That right, Wutherington?" he said to the Butler, who was dressed like those extinct penguins you see sometimes on 3V.

"Yes, Inspector. Quite correct. That was the subject of their arguments — mostly." I could see he was going to go on past his written lines, but the old filibustering Inspector jumped in without a thought.

"Just as I suspected," he said, wiggling his forefinger at nobody in particular. "Now who else benefits? Perhaps you, Mr. Smythe, as Hughes's lawyer, can tell us?"

The Lawyer, standing with his back to the fireplace, allowed as how the Maid was to get a third of the insurance money.

"EHEU!" the BoP got out before Li clamped a big hand over its face. He let go, and it whispered, "'Tis the Maid, who hath committed this foul work!"

"You're jumping to conclusions," Li told the BoP. "Wait and see. That's my wife hauling off to speak, Andy."

"I wouldn't never have done such a thang," cried the Maid in a mixture of Cockney, Texas and Outworld, "what with me carryin' Mr. Hughes's child and all, and 'e promisin' 'e 'e'd divorce Mrs. Hughes and do roight by me and the byby!"

"Had I but known," said Mrs. Hughes, "I would have murdered him myself, and not in any darn pool, either!"

"Besides," the Maid went on, "me and the Mistress, we was together on that fyteful night!"

The Lawyer spoke again, after a silence during which nobody seemed to know what to do: "And the remaining third was to go to Guru Rabindrinath Makeesh, noted yogi!"

"Surely," breathed the BoP, "this Makeesh was the messenger of death!" And it made ready to take off from Li's shoulder, but Li held it there.

"But," the Inspector added forcefully, and the BoP settled back again, "Rabindrinath Makeesh is missing — and the computer says the only Rabindrinath

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Makeesh in the world is in India, not New York, and that he is only nine years old and definitely neither a guru or a yogi, so I guess that lets him out."

"Then who slew my dear, departed husband?" cried Mrs. Hughes, and the others nodded and made inquiring sounds.

"The only one left," said the Inspector, "is the least likely suspect, the person with no motive. And everybody knows it's always the least likely suspect who committed the crime!"

I didn't think much of that kind of logic, but I didn't say anything till Li asked me what I thought. "I don't know who it was, but no court would convict him on that kind of evidence," I told him.

"Behold!" said the Inspector, pointing, and the actors all turned theatrically toward the staircase that went up about 20 feet and stopped just short of the plastic background. A New York bobby walked down; he must have gone up earlier in the play. He was holding a long narrow cloth in one hand and a bathrobe and sandals in the other. He handed them to the Inspector, who turned abruptly to the Butler. "These were found in your room, Heathecliff Wutherington, alias Rabindrinath Makeesh! I accuse you of disguising yourself as Makeesh and hypnotizing Harold Hughes into taking out the insurance policy — and striking him from behind and pushing him into the pool when he refused to commt suicide even under hypnosis!"

"Yes, yes!" shouted Wutherington. "I did it! And I'll tell you *why* I did it!" Before he could explain, the BoP shrilled out, "Assassin! The sting of retribution bites deep!" and it flew out over the audience and planted itself firmly on Wutherington's head. "Thou art Rabindrinath Makeesh, alias Heathecliff Wutherington, servant to, and slayer of, billionaire Harold Hughes!"

The audience stood up and applauded as the curtain came down. By that time, both Li and I were onstage.

"No, no!" the actor was saying to the BoP. "I'm Jack Black, playing the parts of Rabindrinath Makeesh and Heathecliff Wutherington! I'm an actor. Ask anybody — "

"Slaughterer!" yelled the BoP.

"No, look — there's Bat Durston. He played the part of Harold Hughes. See? He isn't dead!"

Jack Black was reaching up to yank BoP off his head, but Li spoke up quickly and authoritatively. "I wouldn't do that if I were you. You'll kill yourself if you succeed, which is very

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doubtful. It's rooted into your nervous and circulatory systems now."

"Then how do I get rid of it?" wailed Black.

"You don't. You live symbiotically with it. It's really very good company." Li turned to the Maid and held out his cheek to be kissed, which she did obediently. "Good to see you," they both said. Li gave Black the high silk hat he had been carrying. "Put this on. It covers the BoP completely and I happen to know it's your size."

"You do?" Black asked blankly. "How?"

"Husband," said Mrs. Li, "if I'd known you had a plan to bring Jack back to Vega IV, I'd never have used the tangle gun on you."

"I didn't mind that so much," Li replied, rubbing the back of his head, which reminded me of my own lump. "But you might have spared us that antique truncheon I told you always to carry."

"So it was you!" I shouted. "And you knew about it, Mr. President! Why didn't you tell me?"

"The subject never came up, Andy," he said.

"But *why*?" Black asked a second before I could get the same words out. "I admit that I'm a very good actor, possibly a great one, but — "

"I'm afraid it's impossible to go into Vegan mores with so little time. Let's just say that Lyla dutifully kept me informed on such things as wanting to go on the stage, falling in love with your picture in a magabook in a doctor's office and, of course, wanting to marry you."

Black smiled radiantly at her. "My dear girl, that's too, too flattering. I'd have been delighted to marry you without this — this damned BoP and a top hat. Why did I have to be saddled with them?"

"Well," said Li, "it seems we have the only surviving copy of the Second Folio of *Lincoln in Illinois,* and the man who'd been playing Lincoln all over the Vegan system died recently. We want you to take his place."

"Lincoln?" asked Black. "Lincoln who?"

"Abraham Lincoln. A legendary folk-hero of the 18th or 20th century. He always wore a top hat. If you played Lincoln, nobody would ever know about the BoP."

"Dash it!" Black exclaimed. "I'd have been willing to go to Vega IV, marry this delightful child and act in your old play without such devious schemes!"

"At a thousand dollars a week?"

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Black stiffened. He was very good at it. "Absolutely not, Lyla and BoP or no Lyla and BoP! People haven't earned that little since the Second or Third World War."

I spoke up a bit reluctantly. "President Li has thought this all the way through, Mr. Black. That's why he needed an Andytec — to hold you for deportation as a Vegan criminal in case you rejected his offer."

"But how can I be a Vegan criminal when I've never been to Vega IV?"

"You're wearing a BoP. That makes you a Vegan criminal. Shall I arrest him, Mr. President?"

"Let's try friendly persuasion first, Andy." He looked at the actor, who didn't know which he should be more, frightened or upset. "How much do you make here, Black?"

"The company gets a ten-million-a-year grant from the General Foundation. I take the first million. The rest goes for cast, crew and theater."

"And what are your expenses?"

Black didn't think it was any of Li's business, but admitted under grilling to a quarter of a million for rent, food about another quarter million, which is about right if he doesn't eat out too often, another quarter million for clothing, haircuts, antigrav cabs, trips and so forth and, of course, taxes, about another quarter of a million.

"Well, on Vega IV," said Li, "it would only cost you 10 per cent for payments on a house as big as you like. 20 per cent for food, 10 per cent for taxes — and you'd own your own house and antigrav car after only ten years, not to mention your own flower and vegetable gardens — and a robot to come in three times a week to clean."

It sounded like the paradise Li had been claiming it was. I almost wished I could go with them. I might have, too, if androids were allowed to travel and own property.

Black finished out how much all that came to. "I don't believe it! Are you telling me that I would have money *left over?*"

"Yes. And you can do anything you like with it."

"That," said Black, "takes care of that!"

Mrs. Li let out a happy squeal. "Then you'll go back with us and marry me?"

"That kind of depends on you, doesn't it?" Black said to Li. "Would you be willing to give her a divorce?"

"Why, no divorce is necessary," said Li expansively. "Lyla has to marry once more, at 36,

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to an 18-year-old-boy — but you can get together when she's 54."

"Will you still want me then?" Mrs. Li wanted to know.

"You'll be even more desirable at 54 than you are now," Black told her. She lit up like an unoccupied antigrav cab. That sure was a good line to remember.

I turned to the President of Vega IV. "The BoP, the high silk hat, reservations for three on the midnight flight — it all worked out the way you figured."

"I never doubted it for a moment." He shook my hand — the first time a human ever shook hands with me! "Excuse us if we seem to be running out, Andy. We just have time to catch the ship."

V

Back at Precinct, I asked what's-her-name at the switchboard, "Will you marry me when you're 54?"

"Are you out of your mind?" she said. "Androids don't marry."

"You will be even more desirable at 54 than you are now," I told her, with a flourish of the arm, the way Black had done it.

"You're darn right. I'm 63. Now knock it off; the Commissioner wants to see you as soon as you come in, which is right now."

Shaking, I pushed the one-way-screen button and went in when the door opened. The Commissioner was on the visiphone. Who with? Li himself, right there on the visiscreen! His lips were moving, but the Commissioner was on the privacy key, and I suddenly regretted not knowing how to read lips. On the other hand, I thought, it was better not to know. What particular goofs of mine was Li complaining about? Without even searching my mind, I could name a dozen or more.

The Commissioner got in a few uh-huhs and a thank you and switched off. He swiveled around me. "That was President Li," he told me unnecessarily.

Li would have said, "I know," but all I could manage was a weak yes, "Yes, Commissioner?" I waited to be consigned to the old Vat.

"He says — are you ready, Andy?" I nodded my dry-mouthed head. "He says you were very efficient, capable and tactful!"

"Me?" I almost gasped, but didn't. I nodded again instead.

"I've had my eye on you for some time, Andy, and President Li's call merely confirms it. I think you're Andyphilo material! A few more of these diplomatic assignments, and I'll put through your promotion. You know what that means, eh?"

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You can bet your sweet protoplasm I did! Tired as I was, I lit up every bit as brightly as Mrs. Li had, especially when the Commissioner shook hands with me, making it twice in one day, and walked me to the door!

I thumbed open my sleep-closet. Humming to myself, something I don't ever remember doing before, I leaned back against my tiltboard and strapped myself in.

If I made Andyphilo, do you know what I would rate? A *horizontal* sleep-closet! Complete with airform bed!

Vega IV — hah! Earth is the only place for androids!

—E. J. & H. L. GOLD

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FORECAST

Four months ago we ran two full-page ads in *Galaxy*, both rather unusual in that they were paid for by our contributors. One was a list of science-fiction writers who wanted the United States to get out of Vietnam; the other, a list, nearly as long, of equally celebrated sf writers who wanted us to stay there.

What struck us about these two lists is that we know nearly everyone who signed both advertisements and feel sure that both camps are as one in their view of what a proper human world should be like. It is not ultimate goals that divide them, but essentially a difference in tactics. And so we took the money that the writers paid to have their opinions published and used it to establish a fund for five $100 prizes for the best suggestions anyone — reader, writer or whatever — had to offer on what to do about Vietnam.

Next month we'll be reporting the winners of those prizes. More than that, we'll be telling you about what we plan to do next. For the choice of tactics is not really an arcane mystery, knowable only to God. Achieving the kind of world nearly all of us want is basically only one more problem among many, and we think it can be solved through the application of technological problem-solving techniques similar to those used in science and government today. And we're going to try . . . and we'll be keeping you posted on how it all works out, starting next month.

Stories? Oh, to be sure there will be stories as well! Gordon R. Dickson is back next month; so is Robert Silverberg. John Wyndham, whose *Day of the Triffids* is one of science-fiction's all time best-sellers, will be also be present if space permits — plus enough others, we think, to make it a really good issue even without the report on the Vietnam problem-solving study. But we think you'll be specially interested in that; we are!

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Crosstime found an infinity of possible nows. Each of them was real; and all of them were — meaningless!

There were timelines branching and branching, a mega-universe of universes, millions more every minute. Billions? Trillions? Trimble didn't understand the theory, though God knows he'd tried. The universe split every time someone made a decision. Split, so that every decision ever made could go both ways. Every choice made by every man, woman and child on Earth was reversed in the universe next door. It was enough to confuse any citizen, let alone Detective-Lieutenant Gene Trimble, who had other problems to worry about.

Senseless suicide, senseless crime. A city-wide epidemic. It had hit other cities too. Trimble suspected that it was world wide, that other nations were simply keeping it quiet.

Trimble's sad eyes focused on the clock. Quitting time. He stood up to go home and slowly sat down again. For he had his teeth in the problem, and he couldn't let go.

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Not that he was really accomplishing anything.

But if he left now, he'd only have to take it up again tomorrow.

Go, or stay?

And the branchings began again. Gene Trimble thought of other universes parallel to this one, and a parallel Gene Trimble in each one. Some had left early. Many had left on time, and were now halfway home to dinner, out to a movie, watching a strip show, racing to the scene of another death. Streaming out of police headquarters in all their multitudes, leaving a multitude of Trimbles behind them. Each of these trying to deal, alone, with the city's endless, inexplicable parade of suicides.

Gene Trimble spread the morning paper on his desk. From the bottom drawer he took his gun-cleaning equipment, then his .45. He began to take the gun apart.

The gun was old but serviceable. He'd never fired it except on the target range and never expected to. To Trimble, cleaning his gun was like knitting, a way to keep his hands busy while his mind wandered off. Turn the screws, don't lose them. Lay the parts out in order.

Through the closed door to his office came the sounds of men hurrying. Another emergency? The department couldn't handle it all. Too many suicides, too many casual murders, not enough men.

Gun oil. Oiled rag. Wipe each part. Put it back in place.

Why would a man like Ambrose Hardesty go off a building?

In the early morning light he lay, more a stain than a man, thirty-six stories below the edge of his own penthouse roof. The pavement was splattered red for yards around him. The stains were still wet. Harmon had landed on his face. He wore a bright silk dressing gown and a sleeping jacket with a sash.

Others would take samples of his blood, to learn if he had acted under the influence of alcohol or drugs. There was little to be learned from seeing him in his present condition.

"But why was he up so early?" Trimble wondered. For the call had come in at 8:03, just as Trimble arrived at headquarters.

"So late, you mean." Beatley had beaten him to the scene by twenty minutes. "We called some of his friends. He was at an all-night poker game. Broke up around six oclock."

"Did Harmon lose?"

"Nope. He won almost five hundred bucks."

"That fits," Trimble said in disgust. "No suicide note?"

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"Maybe they've found one. Shall we go up and see?"

"We won't find a note," Trimble predicted.

Even three months earlier Trimble would have thought, *How incredible!* or *Who could have pushed him?* Now, riding up in the elevator, he thought only, *Reporters.* For Ambrose Harmon was news. Even among this past year's epidemic of suicides, Ambrose Harmon's death would stand out like Lyndon Johnson in a lineup.

He was a prominent member of the community, a man of dead and wealthy grandparents. Perhaps the huge inheritance, four years ago, had gone to his head. He had invested tremendous sums to back hairbrained quixotic causes.

Now, because one of the hairbrained causes had paid off, he was richer than ever. The Crosstime Corporation already held a score of patents on inventions imported from alternate time tracks. Already those inventions had started more than one industrial revolution. And Harmon was the money behind Crosstime. He would have been the world's next billionaire — had he not walked off the balcony.

They found a roomy, luxuriously furnished apartment in good order, and a bed turned down for the night. The only sign of disorder was Hardesty's clothing — slacks, sweater, a silk turtleneck shirt, knee-length shoesocks, no underwear — piled on a chair in the bedroom. The toothbrush had been used.

He got ready for bed, Trimble thought. He brushed his teeth, and then he went out to look at the sunrise. A man who kept late hours like that he wouldn't see the sunrise very often. He watched the sunrise, and when it was over, he jumped.

"Why?

They were all like that. Easy, spontaneous decisions. The victim-killers walked off bridges or stepped from their balconies or suddenly flung themselves in front of subway trains. They strolled halfway across a freeway, or swallowed a full bottle of laudenaum. None of the methods showed previous planning. Whatever was used, the victim had had it all along; he never actually went out and *bought* a suicide weapon. The victim rarely dressed for the occasion, or used makeup, as an ordinary suicide would. Usually there was no note.

Harmon fit the pattern perfectly.

"Like Richard Corey," said Bentley.

"Who?"

"Richard Corey, the man who

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had everything. 'And Richard Corey, one calm summer night, Went home and put a bullet through his head.' You know what I think?"

"If you've got an idea, let's have it."

"The suicides all started about a month after Crosstime got started. I think one of the Crosstime ships brought back a new bug from some alternate timeline."

"A suicide bug?"

Bentley nodded.

"You're out of your mind."

"I don't think so. Gene, do you know how many Crosstime pilots have killed themselves in the last year? More than twenty percent!"

"Oh?"

"Look at the records. Crosstime has about twenty vehicles in action now, but in the past year they've employed sixty-two pilots. Three disappeared. Fifteen are dead, and all but two died by suicide."

"I didn't know that." Trimble was shaken.

"It was bound to happen sometime. Look at the alternate worlds they've found so far. The Nazi world. The Red Chinese world, half bombed to death. The ones that are totally bombed, and Crosstime can't even find out who did it. The one with the Black Plague mutation, and no penicillin until Crosstime came along. Sooner or later — "

"Maybe, maybe. I don't buy your bug, though. If the suicides are a new kind of plague, what about the other crimes?"

"Same bug."

"Uh, uh. But I think we'll check up on Crosstime."

Trimble's hands finished with the gun and laid it on the desk. He was hardly aware of it. Somewhere in the back of his mind was a prodding sensation: the *handle,* the piece he needed to solve the puzzle.

He spent most of the day studying Crosstime, Inc. News stories, official handouts, personal interviews. The incredible suicide rate among Crosstime pilots could not be coincidence. He wondered why nobody had noticed it before.

It was slow going. With Crosstime travel, as with relativity, you had to throw away reason and use only logic. Trimble had sweated it out. Even the day's murders had not distracted him.

They were typical, of a piece with the preceding eight months' crime wave. A man had shot his foreman with a gun bought an hour earlier, then strolled off toward police headquarters. A woman had moved through the back row of a dark theater, using an ice pick to stab members

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of the audience through the backs of their seats. She had chosen only young men. They had killed without heat, without concealment; they had surrendered without fear or bravado. Perhaps it was another kind of suicide.

Time for coffee, Trimble thought, responding unconsciously to a dry throat plus a fuzziness of the mouth plus slight fatigue. He set his hands to stand up, and —

The image came to him in an endless row of Trimbles, lined up like the repeated images in facing mirrors. But each image was slightly different. He would go get the coffee *and* he wouldn't *and* he would send somebody for it, and someone was about to bring it without being asked. Some of the images were drinking coffee, a few had tea or milk, some were smoking, some were leaning too far back with their feet on the desks (and a handful of these were toppling helplessly backward), some were, like this present Trimble, introspecting with their elbows on the desk. Damn Crosstime anyway.

He'd have had to check Harmon's business affairs, even without the Crosstime link. There might have been a motive there, for suicide or murder, though it had never been likely.

In the first place, Harmon had cared nothing for money. The Crosstime group had been one of many. At the time that project had looked as hairbrained as the rest: a handful of engineers and physicists and philosophers determined to prove that the theory of alternate time tracks was reality.

In the second place, Hardesty had no business worries.

Quite the contrary.

Eleven months ago an experimental vehicle had touched one of the world's of the Confederate States of America and returned. The universes of alternate choice were within reach. And the pilot had brought back an artifact.

From that point on, Crosstime travel had more than financed itself. The Confederate world's "stapler," granted an immediate patent, had bought two more ships. A dozen miracles had originated in a single, technologically advanced timeline, one in which the catastrophic Cuba War had been no more than a wet firecracker. Lasers, oxygen-hydrogen rocket motors, computers, strange plastics — the list was still growing. And Crosstime held all the patents.

In those first months the vehicles had gone off practically at random. Now the pinpointing was better. Vehicles could select any branch they prefer-

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red. Imperial Russia, Amerindian America, the Catholic Empire, the dead worlds. Some of the dead worlds were hells of radioactive dust and intact but deadly artifacts. From these worlds Crosstime pilots brought strange and beautiful works of art which had to be stored behind leaded glass.

The latest vehicles could reach worlds so like this one that it took a week of research to find the difference. In theory they could get even closer. There was a phenomenon called 'the broadening of the bands' . . .

And that had given Trimble the shivers.

When a vehicle left its own present, a signal went on in the hangar, a signal unique to that ship. When the pilot wanted to return, he simply cruised across the appropriate band of probabilities until he found the signal. The signal marked his own unique present.

Only it didn't. The pilot always returned to find a clump of signals, a broadened band. The longer he stayed away, the broader was the signal band. His own world had continued to divide after his departure, in a constant stream of decisions being made both ways.

Usually it didn't matter. Any signal the pilot chose represented the world he had left. And since the pilot himself had a choice, he naturally returned to them all. But —

There was a pilot by the name of Gary Wilcox. He had been using his vehicle for experiments, to see how close he could get to his own timeline and still leave it. Once, last month, he had returned twice.

Two Gary Wilcoxes, two vehicles. The vehicles had been wrecked — their hulls intersected. For the Wilcoxes it could have been sticky, for Wilcox had a wife and family. But one of the duplicates had chosen to die almost immediately.

Trimble had tried to call the other Gary Wilcox. He was too late. Wilcox had gone skydiving a week ago. He'd neglected to open his parachute.

Small wonder, thought Trimble. At least Wilcox had had motive. It was bad enough, knowing about the other Trimbles, the ones who had gone home, the ones drinking coffee, et cetra. But — suppose someone walked into the office right now, and it was Gene Trimble?

It could happen.

Convinced as he was that Crosstime was involved in the suicides, Trimble — some other Trimble — might easily have decided to take a trip in a Crosstime vehicle. A short trip. He could land here.

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Trimble closed his eyes and rubbed at the corners with his fingertips. In some timeline, very close, someone had thought to bring him coffee. Too bad this wasn't it.

It didn't do to think too much about these alternate timelines. There were too many of them. The close ones could drive you buggy, but the ones further off were just as bad.

Take the Cuba War. Atomics had been used, *here* and now Cuba was uninhabited, and some American cities were gone, and some Russian. It could have been worse.

Why wasn't it? How could we luck out? Intelligent statesmen? Faulty bombs? A humane reluctance to kill indiscriminately?

No. There was no luck anywhere. Every decision was made both ways. For every wise choice you bled your heart out over, you had made all the other choices too. And so it went, all through history.

Civil wars unfought on some worlds were won by either side on others. Elsewhen, another animal had first done murder with an antelope femur. Some worlds were still all nomad; civilization had lost out. If every choice was cancelled elsewhere, why make a decision at all?

Trimble opened his eyes and saw the gun.

That gun, too, was endlessly repeated on endless desks. Some of the images were dirty with years of neglect. Some smelled of gunpowder, fired recently, a few at living targets. Some were *loaded. All were as real as this* one.

A number of these were about to go off by accident.

A proportion of these were pointed, in deadly coincidence, at Gene Trimble.

See the endless rows of Gene Trimble, each at his desk. Some are bleeding and cursing as men run into the room following the sound of the gunshot. Many are already dead.

Was there a bullet in there? Nonsense.

He looked anyway. The gun was empty.

Trimble loaded it. At the base of his mind he felt the touch of the *handle*. He would find what he was seeking.

He put the gun back on his desk, pointing away from him, and he thought of Ambrose Harmon, coming home from a late night. Ambrose Harmon, who had won five hundred dollars at poker. Ambrose Harmon, exhausted, seeing the lightening sky as he prepared for bed. Going out to watch the dawn.

Ambrose Harmon, watching the slow dawn, remembering a two thousand dollar pot. He'd

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bluffed. In some other branching of time, he had lost.

Thinking that in some other branching of time, that two thousand dollars included his last dime. It was certainly possible. If Crosstime hadn't paid off, he might have gone through the remains of his fortune in the past four years. He liked to gamble.

Watching the dawn, thinking of all the Ambrose Harmons on that roof. Some were penniless this night, and they had not come out to watch the dawn.

Well, why not? If he stepped over the edge, here and now, another Ambrose Harmon would only laugh and go inside.

If he laughed and went inside, other Ambrose Harmons would fall to their deaths. Some were already on their way down. One changed his mind too late, another laughed as he fell . . .

Well, why not? . . .

Trimble thought of another man, a nonentity, passing a firearms store. Branching of timelines, he thinks, looking in, and he thinks of the man who took his foreman's job. Well, why not? . . .

Trimble thought of a lonely woman making herself a drink at three in the afternoon. She thinks of myriads of alter egos, with husbands, lovers, children, friends. Unbearable, to think that all the might-have-beens were as real as herself. As real as this ice pick in her hand. Well, why not? . . .

And she goes out to a movie, but she takes the ice pick.

And the honest citizen with a carefully submerged urge to commit rape, just once. Reading his newspaper at breakfast, and there's another story from Crosstime: they've found a world line in which Kennedy the First was assassinated. Strolling down a street, he thinks of world lines and infinite branchings, of alter egos already dead, or jailed, or President. A girl in a miniskirt passes, and she has nice legs. Well, why not? . . .

Casual murder, casual suicide, casual crime. Why not? If alternate universes are a reality, then cause and effect are an illusion. The law of averages is a fraud. You can do anything, and one of you will, or did.

Gene Trimble looked at the clean and loaded gun on his desk. Well, why not? . . .

And he ran out of the office shouting, "Bentley, listen. I've got the answer . . . "

And he stood up slowly and left the office shaking his head. This was the answer, and it wasn't any good. The suicides, murders, casual crimes would continue . . .

And he suddenly laughed and stood up. Ridiculous! Nobody

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dies for a philosophical point!...

And he reached for the intercom and told the man who answered to bring him a sandwich and some coffee . . .

And picked the gun off the newspapers, looked at it for a long moment, then dropped it in the drawer. His hands began to shake. On a world line very close to this one . . .

And he picked the gun off the newspapers, put it to his head and

fired. The hammer fell on an empty chamber.

fired. The gun jerked and blasted a hole in the ceiling.

fired. The bullet tore a furrow in his scalp.

fired. The bullet took off the top of his head.

—LARRY NIVEN

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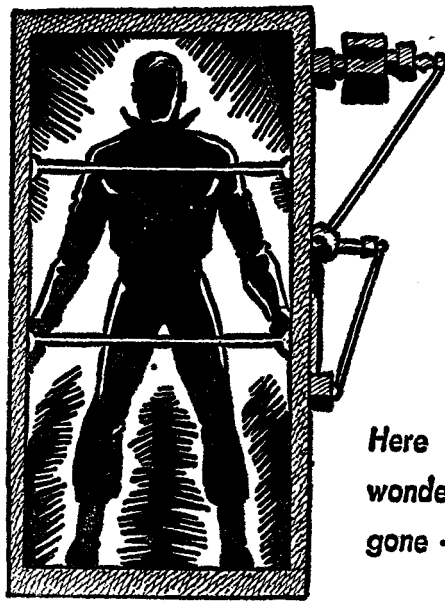

THYRE PLANET

by KRIS NEVILLE

Illustrated by ADKINS

Here we were on Thyre Planet, wondering where everyone had gone — until they all came back!

I

Reginald Bellflower looked out the window of the shuttle ship as it skimmed deeper into the atmosphere of Thyre Planet. At last, below, he could see one of the alien cities. Judging from the constructions, one might imagine the vanished alien race in no way different from earthmen except for language. Down to details in living accommodations, including toilet facilities, the cities, of Thyre Planet were built for human occupation.

Bellflower, 45, was an administrator. For more years than anyone would care to believe, he had attended evening classes in various centers which specialized in producing the executive personality always in such short supply in industry. As a result

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of this schooling, his long-practiced smile of sincerity inspired immedate confidence; his dress was exactly proper for every occasion, social and business; and his composure could not be shaken by any conceivable corporate disaster. He knew every technique and reference source to use in determining the actual requirements of any potential employer. He knew the three best companies to hire for resume writing. He knew how to respond without hesitation to all possible job-placement-interview questions. And, of course, he was thoroughly proficient in working every psychological and intelligence test known to man. His stern credo: Hire the best people available and pay whatever you have to to get them.

Bellflower was now confronted with the most challenging job of his career: General Director of the Scientific Task Force to Solve the Thyre Planet Transportation Problem.

The shuttle, in due time, landed. Bellflower watched the other passengers, all homesteaders doubtless, disembark. When the last man was at the doorway, Bellflower arose and gathered up his belongings at leisure. He walked through the empty cabin to the exit, stepped out and calmly looked around for the welcoming party, already half-fragmented in confusion: thinking he had missed the flight.

The mayor, hand outstretched, bounced up the stairs toward him. "Welcome to Aloseni, Mr. Bellflower!" cried the mayor.

"Mayor Baile?" said Bellflower, taking the hand in a firm, dry grip, making the smile, holding it just long enough to produce the desired effect, letting it go in recognition of the gravity of the situation on Thyre Planet. "I have been looking forward to working with you and your people."

At the bottom of the boarding ramp, Bellflower repeated the performance for the other dignitaries. He placed himself completely at their disposal, showing no impatience, no desire to depart. At length an embarrassed silence fell. Formalities had been concluded. None seemed willing to take the next step, perhaps for fear of offending their guest who was obviously quietly enjoying the welcoming activity.

Bellflower said into the silence, "I guess it's time to go to work."

Instantly, obeying Bellflower's suggestion, Mayor Baile said, "We'll go into my office and go over the situation right now, if you're not too tired from the trip."

Bellflower bent to his suitcases.

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"Let's have these sent over to my hotel." Someone came forward to relieve him of them. "Very well, Mayor Baile. Gentleman, thank you all for coming out. We'll be working closely together."

The mayor started away, Bellflower following.

An instant of shock and terror enveloped the general director of STFSTPTP then. The mayor was calmly walking toward what must be a Transportation Booth. Bellflower desperately surveyed the newly built spaceport. No ground cars were in evidence!

This development brought perspiration to Bellflower's skin. A man could damned well get killed in one of those Transportation Booths. Was he expected to use them, too?

But of course you are, logic told him for the first time.

When the mayor opened the door of the Transportation Booth, Bellflower drew back instinctively. The mayor said, "Everyone is a little uneasy the first few trips. Eventually, after a week or two, you get used to it. The fatality rate is only point oh-oh-oh, oh-oh-oh two five of one percent."

Bellflower quickly rephrased the statistic to a mathematical aptitude test question. Given that the present population of Thyre Planet is one billion and the year (as on Mother earth) contains 365 days. By postulating an average travel rate per person of 3000 trips a year, Bellflower was readily able to calculate a fatality rate of approximately 20 per day . . . assuming he had the decimal right. Each day he stayed on Thyre Planet, he faced one chance out of 50 million of being killed by the transportation system.

He stepped into the booth, his terror slowly departing. It was wildly improbable that he would be killed. Somebody else would be. It would take the Transportation Booths over 100,000 years to kill him.

"Now, here's the way you work it," said the mayor. "You dial your number, in this case, my office. . . . Then you pull this lever. . . . " The outside world became opaque, and the two men were isolated. "Now," continued the mayor, "you wait for this light to flash, which indicates your office is ready to receive you. For God's sake always wait for the light to flash; you'll be killed every time otherwise. Now, see it flash? Now you push this button."

As he listened to the instructions, Bellflower watched the mayor of Aloseni. In the logical part of his mind, he thought that there were entirely too many operations involved, and that with

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proper redesign there seemed no reason not to eliminate at least two of them.

When the mayor pushed the button, blood spurted from the side of his head.

"Good God!" cried Bellflower. "Your ear!"

Stunned, the mayor put a hand to his head. "My ear is torn off!" he cried. "Jesus! It *hurts!* Don't stand there! Get the damned first-aid kit! Get the doctor in here! It's hurting like hell!"

Bellflower saw for the first time that they were in a different Transportation Booth. He could tell because the opacity was gone and beyond the glass door was an office. Bellflower slammed through the door crying, "Get a doctor! Mayor Baile is hurt!"

The room filled almost immediately with employees. First aid was given. Within three minutes a doctor stepped out of the Transportation Booth and took charge. He inspected the mayor quicky before rendering a verdict. "You're going to be all right. You've just lost an ear is all. We'll get you right over to the hospital."

"Thank God it wasn't any worse," said the mayor.

Bellflower stood helplessly to one side, watching the mayor and the doctor depart by means of the Transportation Booth. He faced a horrible sinking sensation that came when he realized that he was going to have to step back into that little booth to get to his motel.

II

Within a week, Bellflower was situated in his offices. The general director's suite seemed not to accord completely with his job responsibilities, but for the first few months, during program buildup, he would make do. In seven days, the unfamiliarity of the alien city vanished into his subconscious to trouble him only in vague dreams of the classic insecurity type. He was assured these, too, would pass. The strange and contradictory color combinations, the texture of the wood, the hand of the synthetics, the unfamiliar odors, the unusual tastes had blended into the natural environment.

He reviewed his presentation for Colonel Ramsey, head of the Thyre Planet Citizens' Committee for Public Transportation. This blue-ribbon committee, appointed by the president of Thyre Planet to develop the scientific team to solve the transportation problem, was as near, at the moment, to an employer as Bellflower had.

Colonel Ramsey stepped out of the Transportation Booth exactly at the appointed hour. The

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clear-circuit signal a moment before his arrival gave Bellflower a chance to compose his smile.

When the amenities had been completed, Bellflower said, "I understand Dr. Nostran will arrive tomorrow? I must congratulate you again on obtaining his services."

"We were amazed he would consent," said Colonel Ramsey. "He made a personal presentation and he was the only one who did who seemed to have a firm, scientific grasp of our problem here on Thyre. You would expect no less from Dr. Nostran. I don't mind telling you, we felt very lucky to get him."

"I am looking forward to the opportunity of working with him," said Bellflower. "I have been moving ahead as quickly as I can in his absence. I am presently recruiting senior staff members in accordance with this Table of Organization." He passed the document over to Colonel Ramsey, who studied it.

At length Colonel Ramsey said, "This is a professional document. I wish my people could do as well. But it's what we expect of you."

"I expect the quality of my work to be reviewed along with everyone else's," said Bellflower. "A man stands on his performance. I don't like excuses. I don't make excuses."

"A commendable attitude," said the colonel. "I wish my people had that attitude, but I'm afraid there is a lack of true executive talent in the universe."

"I am slowly coming to an appreciation of the magnitude of our problem here on Thyre," said Bellflower. "I don't want to minimize the committment or resources that will have to be made, nor do I wish to promise a solution within a week, a month or even a year. This may be one of the most difficult problems ever tackled by the human race."

"We didn't find any scientific experts who thought it would be easy."

"Fundamentally," said Bellflower, "we are dealing with a problem of divergent cultures. Superficially these cultures are virtually identical. In fact, they are profoundly different. Their very thought processes, their very ways of thinking about the universe, are at opposite extremes. I see our job, in a larger sense, as achieving a synthesis of these two opposites.

"We must, in short, learn the thought processes of the Thyrians. We must follow them up the evolutionary ladder; we must isolate divergent tendencies, analyze them, project them into scientific constructs. These clues will offer

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Dr. Nostran a *philosophical* basis for his new physics. Both programs must advance in parallel developments."

Colonel Ramsey, impressed, said, "I see you have not stopped thinking after having made your successful presentation to the committee."

"I will work on this problem twenty-four hours a day. I will saturate my subconscious until the Scientific Task Force becomes the stuff of my dreams. I continually turn the situation over in my thoughts, seeking some tiny new insight, some small clue that can lead us a step forward. Step by step, clue by clue . . . "

Bellflower settled deep into his chair. His eyes lost their focus to sight on distant, invisible goals — a technique he had mastered only by self-deception. "I always encourage my people to see the positive aspects of any research. I do not believe negative thinking is constructive. Let me give you an example.

"I've talked to a dozen people who keep coming back to Captain MacDonald's blunder. What is to be served by worrying over that again? What is to be served by discussing endlessly Commander Aloseni's role? *Should* he have forbidden the use of radar? The whole question is academic. Let's take the positive approach.

"How could a culture develop to this point without discovering radar? How could they store all their recorded data, every bit of it, their whole history, on tape that could be erased by radar frequencies?

"It doesn't help to say that if all those recordings hadn't been erased, we would be able easily to read the solution to our transportation problem from them. That's past. What does help is asking ourselves how such an advanced culture could be so stupid. This is the problem we have to address ourselves to."

"Your point is very well taken," said Colonel Ramsey. "I wish my own people would learn to take a positive approach like that."

"My mind," said Bellflower, "keeps continually returning to this cultural polarity. It illustrates the magnitude of the task before us. The Thyrians have developed a method of transportation unknown anywhere else in the universe. And yet, yet . . . it seems almost within our grasp, doesn't it? We have the Corsi equations. They tell us how to effect no-time transmissions between spacial coordinates. And what is more common than starship flights? We think nothing of a journey of a thousand light-years. Yet the energy require-

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ments are fantastic and nowhere in the Corsi equations can we learn how to do matter transmission in close proximity to a strong gravitational field.

"Yet here on Thyre, with one atomic pile for power and a single computer, the Thyrians erected this vast network of matter transmitters. What was the x-equation their scientific genius evolved? We look at the world through different eyes. Ironic that neither race ever guessed the other's secret!"

"I wish my people had your broad perspective," said Colonel Ramsey.

"I do not underestimate the magnitude of this job. I studied it carefully before I made application for the position of General Director. I would not have hesitated to turn the appointment down if I felt for a single moment that there would not be enough resources to carry out the assignment properly. I expect defeat.

"But I ultimately expect victory.

"Every day twenty men, women and children step into a Booth, just like the one over there, and emerge mangled corpses an instant later. Every day people are horribly and permanently mutilated by that device. I, myself, saw Mayor Baile lose an ear. I want to work on this program. But I must know that our scientific people have every resource at their disposal.

"Even if my scientists ultimately discover after years and years of work that there is no solution to the problem, I want to know that I, personally, made the best try anyone could make to end this needless slaughter."

"Mr. Bellflower," said Colonel Ramsey, "this is the kind of support you have every right to expect from us. The committee, every man and woman on it, is personally committed to see that that is exactly the kind of support you will get."

"I deeply appreciate your confidence," said Bellflower.

III

Two days later, Bellflower spoke privately with his chief scientist, Dr. Seymour Nostran, newly arrived to assume duties.

Bellflower opened the conversation on a social note. "You find, doctor, after a few trips in the Booth, you don't mind it any more. We're only losing twenty a day, on the average. The figure will go up as more immigrants move in, but the odds remain constant."

Dr. Nostran did not dispute the point.

"I suggest," said Bellflower,

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"we each make our own adjustment in our own way. The only effect the sociologists have noted has been a slight increase in the suicide rate. Each of us develops our superstition: that accidents won't happen twice from the same booth; that an accident to a close associate or family member confers immunity on oneself; that a strong belief in the power of a talisman will influence external reality in one's favor . . . . We each adjust in our own way: you and I, to a knowledge of probabilities, which establishes our thinking on a firm, scientific basis."

Dr. Nostran said, "My stomach still knots up every time I get into one of those damned things."

Dr. Nostran," said Bellflower, "what do you think of our chances? What are we up against; what do we need to get the job done? I was certainly not able to follow all the details in your presentation to the Thyre Committee, but I wonder if you could explain the Nostran Theory to me in layman's terms?"

"The theory," said Dr. Nostran, "is an evolutionary growth, the final culmination of research that extends back into antiquity. It no more belongs to me than it does to the millions of physicists traveling the same path before me. You are familiar with

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what used to be called quantum mechanics, one of the loveliest intellectual concepts of the human race? I returned to this theory rather than the Corsi equations. My contribution is to postulate that the quanta do not reprsent discrete jumps, but are composed of a number of interrelated elements I chose to call pifilins.

"Now the Nostran Theory, so-called, essentially proposes that the various *alpha*-pifilins interact with the *gamma*-pifilins to produce conditions formerly referred to as the quanta. Whereas it could be demonstrated that the location or energy of a single quantum-particle was indeterminate, I propose that *both* the location and energy of the two pifilins are indeterminate. This is the crucial point, however: I suggest that the combination condition, commonly held to be the quanta, is absolutely determinate. Provided only that we can establish the actual value for the ideal mass of either the *alpha*-pifilin or the *gamma*-pifilin. The problem poses unusual experimental difficulties.

"I suggested to the Thyre Committee that the malfunction of the transportation system on this planet arises from this very uncertainty principle, operating statistically over billions and billions of molecules in transit between Booths. The problem is insoluble in terms of our present revised Corsi equations. An approach through the old quantum mechanics, as reinterpreted by the Nostran Theory, is our only hope for success."

"Then you are proposing extensive research?" asked Bellflower. "I took that to be the case from your presentation."

"There is no other way, Mr. Bellflower. I have devoted my life to this research, and I can tell you it will tax our resources to the limit if we are to conclusively determine the ideal mass of the *gamma*-pifilin. But it represents, in my opinion, the only real solution to Thyre's ghastly accident rate.

"I may as well be frank with you, Bellflower. I would never have consented to the scientific management of this program if I felt for a single instant that pecunious administrators would withhold needed funds, as they have been known to do all too often in the past. With human lives at stake, almost 8,000 a year, we have no alternative but to persevere until we have determined the ideal mass of the *gamma*-pifilin."

"And, doctor, once done — ?"

"The engineers should be able to apply the new equations immediately in the redesign of the Transportation System."

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That night, Dr. Nostran wrote his colleague on the planet Thorsen:

> Dear Professor Rind:
>
> I am now established on Thyre Planet and have had a very successful conference with Reginald Bellflower, the principal administrator of the project I wrote you about. I know you will be as elated as I am to learn that at last I am assured of adequate financial support to consummate my lifelong ambition to determine the ideal mass of the *gamma*-pifilin.

IV

Within a month of arrival, Dr. Nostran supplied Bellflower with a detailed estimate of his projected requirements for the first full year of operation.

Bellflower had already acquired a skeleton staff from the local population and was beginning to add elective flesh. An unexpected find had been the man to head up the Engineering Division, a local applicant. This permitted the preliminary design work to get underway within six weeks after receipt of Dr. Nostran's request. Engineering promised construction could begin in eleven months on the largest particle accelerator ever conceived.

Bellflower hired a personnel director from his own home planet, Costain, known to him by reputation: Dr. A. Jung Fiedler. Between them they outlined the recruiting program. First priority went to obtaining suitable people to head the Purchasing Contract Administration and Xenological Divisions, the last a division particularly forward in Bellflower's thoughts, whose job would be to elaborate the psychology on the alien Thyrians.

"Dr. Fiedler," said Bellflower, "I want you to get your department built up as quickly as possible. I want you free to concentrate on getting in three or four top managers. I hope you can start on that in two weeks. Let the staff handle the engineers and scientists. But be sure they know what they're doing. Sell the job, sell its importance. I want to blanket the universe with recruitment ads for just the right people. Be sure to feature the fact Thyre was discovered by a Federation exploration team and that choice homesteads are still available. Next, play up Dr. Nostran. He won't be offended. And then hit heavy on the opportunities for professional advancement, the working conditions, the full support of technical-minded management . . . you know the usual thing. Sell them on the idea they'll have the best and latest equipment and virtually unlimited funds at their dispos-

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al in view of the critical nature of the research."

"I think we ought to play down the actual problem we're working on," said Dr. Fiedler. "I've been here three days and I'm still terrified every time I get into a Transportation Booth. A lot of people will think twice before they'll bring their families to a planet with a transportation system like this."

"That's one reason we pay top salaries," said Bellflower. "I'll leave it to you how to handle it. Better set up a Psychology Group to do some depth research for you and come up with a scientific approach for the copywriters."

"I was thinking along those lines," said Dr. Fiedler.

"Let's try to get some genuinely creative people in the organization, too. We're committed to Dr. Nostran's general approach; we must see he gets every person he needs. But we can support him with a lot of peripheral research. I'm thinking, now, of a special group in the Xenological Division to examine the feasibility of locating surviving Thyrians. First, what are the probabilities that there are still Thyrians on the planet? How much of the planet has not been explored by us as yet? Where would the Thyrians logically be hiding?

"Let's check every inch of territory on the map for possible sites. Let's run an analysis to find out the probability not only of finding Thyrians, but also the probability of finding a technically oriented Thyrian. Out of the total population, whatever it was, what percentage of Thyrians were likely to understand how the Transportation System actually operated? In other words, statistically speaking, what is the maximum number of Thyrians that could be hiding, and out of this number, what are our chances of finding one who could contribute to the solution of our problem? Would the actual search, in short, be worth the expense?

"Let's find out how many aliens there were on the planet when the cities were inhabited. Let's study the cities and estimate the size of the population they were built to serve.

"Let's set up a group to find out what was the recent disaster that led to the total disappearance of the Thyrians. How long ago did it happen? Let's find out why they incinerated their dead and why their visual artists avoided the representation of objects from nature.

"This is the type thinking I want. Let's go after creative people."

"I'm with you all the way,"

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"I want those three division directors within three months. We're going to cut the normal recruiting time in half all the way down the line!"

Under the dynamic management of Bellflower, the operation began to snowball. By the time of ground-breaking ceremonies for the particle accelerator — only two months behind schedule — Bellflower was able to assure the growing population of Thyre Planet that everything conceivable was being done.

Now in the second year of the operation, Bellflower began to devote his energies to larger aspects of the problem.

He was as conditioned as any man on the planet to the use of Transportation Booths. His frequent statement that he made more trips in a day in overseeing the vast organization than most citizens made in a week indicated his interest in the solution was vitally personal.

Colonel Ramsey, the president's liaison with Bellflower now that the citizens committee, goal accomplished, had been dissolved, came for his biweekly briefing.

"We're approaching a planet-wide death rate of thirty a day," the colonel said.

"I've seen the papers," said Bellflower. "We're not getting our story across. Look at the tremendous progress we've made just during the last quarter. Dr. Nostran's accelerator is nearly back on schedule. We have expanded thirteen per cent in terms of technical staff alone. Approximately one million people are now directly on our payrolls, not to mention the people paid by the independent contractors. We have inaugurated a new division exclusively to study the operation of the Transportation Booths from a theoretical standpoint, including what actually occurs during transit. We haven't even been able to solve that problem for the starships! So you see we're trying every approach that is even remotely promising. This is the story we have to get across."

"The president understands this," said Colonel Ramsey. "The papers are making very uninformed criticisms. We're much nearer to the solution than we were a month ago, and there has been no hint of waste and mismanagement above the nominal minimum you've got to expect and allow for in a crash operation of this magnitude. But it's a difficult point, as you say."

"I don't know how often I've repeated obvious statements," said Bellflower. "Take the truism: In physics, the smaller the phenomenon under investigation, the larger the en-

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ergy requirement. What can be more obvious? And the death rate: of course it is going up. What would you expect? The population is going up! Cut down on the population, you'll cut down on the death rate."

"We have some room for optimism on that point," said Colonel Ramsey. "Most of the homestead property is gone. The Federation team expects to complete their work of processing claims in another month or two. Our projection now is that the immigrant population will peak at two million in three years. Then we'll find out how stable the population is going to be, whether Thyre will continue to grow in a logical fashion, or whether Thyre is just another flash in the pan. But we're almost over the hump on the population, and we can be grateful for that."

"There are several things we can do about the immediate problem," said Bellflower. "We need a Public Relations Division to keep the citizens abreast of our work. We're going to have to start getting out press releases, posters, documentary films, tie-in promotions with toy manufacturers . . . you know the sort of thing I mean. We need some good people for a Speakers' Bureau to get the message to the fraternal organizations, the business groups and the schools. We are going to have to create a whole new image of STFSTFTP, starting from the ground up, with a new, catchy nickname."

"We've definitely got to improve the image before the organization becomes a political football," said Colonel Ramsey.

Bellflower bent forward to his desk and requested, by means of the intercom, delivery of a document. When the secretary brought it, he said, "Colonel Ramsey, I want you to look this over. I've been thinking of the larger aspects of the work. An administrator is not only responsible for selling the program to management — in this case the billion and a half citizens on Thyre. But he is also responsible for making whatever contribution he can to the financial end of the operation.

"Appropriations time is coming up very soon." He handed across the document and continued his explanation. "I'm not surprised at the costs we've run into. I have never minced words on the subject of costs, nor has Dr. Nostran. But it's not going to be as expensive as converting to land transportation, as some have proposed. All the cities on Thyre are organized to accommodate the Transportation Booths. It would be impossible to put in a safe and rational system of sur-

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face streets. The expense of inter-city highways, on top of that, would be astronomical! That approach is out. I've heard people say, well, can we afford to solve the problem? Is it worth it?"

Bellflower bent forward intently, fixing Colonel Ramsey's eyes. "Unless something is done, in three years we'll be losing forty people a day, fourteen thousand six hundred a year! The economic cost alone, in terms of deaths and injuries, is already between half and one billion dollars a year, by very conservative figures. And this says nothing of the human suffering. The question must not be: Can we pay for the solution? The question must be: *How* can we pay for the solution?"

"The president is with you one hundred per cent," said Colonel Ramsey.

"Please glance through the proposal. Let me know what you think."

Colonel Ramsey read quietly for a full minute. Looking up at last, he asked, "Do you think we can sell it?"

"I know we can sell it," said Bellflower. "This is one of an administrator's many jobs, if he knows his business. All I need is the president's full support and cooperation."

"Looking back," said Colonel Ramsey, "I think we should have gone after Federation money in the very beginning."

"Yes," said Bellflower, "I could have recommended it at the time. But experience has indicated to me that it's always better to wait a year or two. You have to convince the Federation people that you're serious yourself, that you really intend to carry through.

"If we had tried a year ago, we might not have succeeded. What did we have to show them, then? And it's too hard trying to go back in after you've lost once. Now we're ready.

"This program is a natural for the Federation. Once we get this little kink worked out of the transportation system, look at what the Federation will have bought for its financial support! For the first time in history we will have operational matter transmitters that will function in any gravitational field. It will revolutionize transportation on the surface of every planet in the Federation. Even the spin-off from such research is of incalculable value!"

"I wish you would come with me this afternoon," said Colonel Ramsey "and tell the president what you've told me. Tell it just the way you've told it to me."

"I want you to think of the advantages of this to Thyre. With

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Federation backing, we can really get the program into high gear. Think of what it will mean to the whole economy of Thyre!"

"You must, Mr. Bellflower, come tell the President this yourself. I can't tell you how enthusiastic I am for the idea!"

V

Three months later, Bellflower returned from Coueril, the planetary headquarters of the Federation of Star Systems.

He reported to the president on the success of his mission.

"Mr. President, I am submitting a written report, but I'm very pleased and gratified to have this opportunity of giving you a first-hand account. I must tell you in the beginning that the staff you sent with me did a magnificent job. I literally could not have done it without them. I cannot praise too highly Mr. Leggitt, from the Thyrian National Chamber of Commerce. There is no man more genuinely dedicated to the welfare of Thyre than Mr. Leggitt.

"I can report the mission was entirely successful. We have a firm committment of ten billion dollars from the Federation emergency fund. That will solve our immediate problem with the accelerator backup research in six months. After that, I believe we can really start talking with them about substantial monies."

"Mr. Bellflower," said the president of Thyre, "I don't need to tell you that today you are one of the most popular men on Thyre Planet. I want to assure you, personally, and the whole Save Our Children! organization that we will give you every possible support. I can't tell you with what emotions we have all greeted the Federation action." The president glanced into the distance. "Thyre Planet is a small, new insignificant planet crying out to the stars for aid in our hour of crisis. Now, through you, Mr. Bellflower, the stars have thundered back their support. Here are the billion billion people in the known universe, united through the Federation of Star Systems, extending a hand of assistance to the least of their brothers. No grander day has been known in the history of the race of man! How true it is: Ask and it shall be given you. I heard of your success on TV, Mr. Bellflower, with tears of gratitude in my eyes."

Bellflower, as he waited for Dr. Nostran, surveyed his new offices with appreciation. They occupied one complete floor of the Commercial Building in central Aloseni, the major City on Thyre Planet. The main office

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had been completely remodeled during his fifteen-day stay on Coueril. His offices in the new SOC Administration Complex, now under construction, would be even grander.

Before him on the desk, the second annual report awaited his approval. Two hours from now, he was scheduled to receive an honorary Doctor of Humanities degree from the University of Altung, center of much research on Thyrian psychology sponsored by SOC. His remarks were before him for final reading. The weekly Divisional Progress Reports Summary awaited his study.

Dr. Nostran stepped from the Transportation Booth, smiling. "Congratulations, Bellflower! It's been all over TV for the last three days! Wonderful news! We are pushing full ahead on the accelerator."

Bellflower extended a hand. "How good of you to come over. Please have a seat, Dr. Nostran. I won't keep you but a few minutes."

Beaming, Dr. Nostran, looking younger and more fit than when he arrived on Thyre Planet more than two years ago, drew up the chair and settled himself into it. "My own work is showing good progress. For the first time I feel we are on our way toward making solid progress."

"I've been reading some of the old weekly progress reports since I got back," Bellflower said. "I seem to remember, Doctor, that you once told me you could solve the problem by measuring the ideal mass of either the *alpha*- or *gamma*-pifilin. I have not seen any work at all on the *alpha*-pifilin."

Dr. Nostran admitted he had been working on only the *gamma*-pifilin. It would be very very difficult to do that for the *alpha*-pifilin. Being time-negative, it presents exceptional instrumentation problems. If we had a small time machine, the difficulties would be reduced by an order of magnitude."

"Isn't a time machine a little out of the question, Dr. Nostran? The Corsi equations pretty much eliminate the possibility of time travel in this universe, don't they?"

"Benjamin Corsi was insane!" snapped Dr. Nostran. "There's no question about the authenticity of historical documentation on that point; I have examined many of the original source materials myself. A small time machine just enough to move a negative mass a distance of 10^{-10} angstroms is all we would require."

"If we could build a time machine," said Bellflower after a

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moment, "couldn't we just go back and get all those tapes MacDonald accidentally erased? Where would that leave your main project?"

"We couldn't build one that large until we got the ideal mass of the pifilin. You can see that, Bellflower. A small one, maybe. Not a big one."

"You mean you would really know how to build a time machine if you could get the ideal mass of the pifilin?"

"Jesus Christ, Bellflower, what do you think I'm working on? I'm talking about the ideal mass of the *pifilin!* Once we find that, it's the key to everything!"

"Well," said Bellflower, "perhaps I could sell them just a small time machine. What do you think it would cost to get research started along those lines on a modest scale? One billion? Two billion?"

So the conversation went. At length, having overstayed his time, Dr. Nostran stepped into the Transportation Booth and vanished about his business.

Bellflower closed his eyes and allowed himself a moment of speculation. Suppose Dr. Nostran was right — and who could possibly know whether he was right or not? What kind of a society most certainly would still have to administer the operation of getting rid of all the mistakes in human history, past and future. It would be a job to challenge his own talents. It would be a colossal program which would last more than a human lifetime.

Dr. Nostran was 50 years old. Theoretical work he had done 25 years ago was now in graduate school texts on a billion planets. As the implications of his latest equations became partially evident, many were beginning to call him the Corsi of the Universe. At latest count, he had 92 million honorary doctor's degrees, indicating the general esteem in which he was held by his colleagues. Bellflower was completely persuaded that Dr. Nostran was the perfect man for the job of solving the transportation problem on Thyre Planet.

VI

With the second influx of Federation money on the promised schedule, Bellflower approved the plans for construction of the vast new Research Center, occupying a ten-mile-long site parallel to the particle accelerator excavation. The particle accelerator itself would ultimately consist of a gentle spiral trackway rising twenty-two stories above ground level. Construction was proceeding on schedule, and the 20-mile-long, mile-deep trench had been dug.

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Bellflower was also occupied with a new proposal requested by the president of Thyre Planet. This envisioned the conversion of major areas of the planet to research sites — some connected with SOC, others independent of it. At Bellflower's suggestion, master plans were in preparation to convert Thyre Planet to one of the major research facilities in the universe. SOC was establishing a solid base for this new construction. It already possessed a substantial number of the most famous scientists available, each laboring at the details of his specialty in accordance with Dr. Nostran's vision. Soon it would be doubtful that even the requirements of SOC could immediately accommodate usefully all the available talent they were funded for.

If Bellflower could be said to have a problem, it involved the time machine. The Federation inspection team was due in a month. They would go over the complete operation of the minutest detail. Bellflower knew the financial management aspect was secure against criticism. The Federation accountants would locate some duplication, the elimination of which would save a few milmion dollars here and there to justify their jobs, but otherwise they would approve the program as it stood. The senior scientific staff would doubtless be reluctant to criticize Dr. Nostran on any point, but some junior scientist, just out of school, would unquestionably challenge the time machine on the basis of the Corsi equations. This could lead to an interminable squabble between experts, and so-called experts, and in the end cause the whole debate to erupt into unwanted publicity.

Bellflower decided the best way to avoid difficulty was to confront the time-machine research squarely at the first meeting. The Federation scientists must be made to understand that only a small time machine would be involved and the cost of the development would never exceed ten per cent of the total effort. Even if the research failed, it had cost next to nothing.

Bellflower would have to take the Federation contracting officer aside and explain that there was no intention of attempting to develop an operational model. It was difficult to see how any rational Federation officer in any position of authority could justify funds for that sort of research, since the benefits of the development were obscure and the multiple disadvantages and inherent problems too readily apparent. The contracting officer must be made unequivocably to understand that Dr. Nostran's de-

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vice, if successful, would be nothing more than another tool for the experimental physicists, with no wider application area, except possibly for demonstrations at fairs and in undergraduate science classrooms.

Bellflower's reflections were disturbed by the clear-circuit signal on his Transportation Booth. Bellflower looked up. He had just time to compose his face to its most stony severity before the visitors emerged. It was the height of discourtesy to arrive without advance notification.

Out stepped a man Bellflower identified as one of Dr. Nostran's senior scientists. "Mr. Bellflower," he said, "I hate to go over Dr. Nostran's head this way, but I think we've stumbled onto the solution to our problem."

"What problem is that?" asked Bellflower coldly.

"The problem of what's wrong with the transportation system on this planet," the man said.

"What in God's name are you talking about?" demanded Bellflower.

"It's simply a question of a malfunction in the computer."

"God damn it, man! There *can't* be anything wrong with that computer. . . . Can there?"

The president was smiling when Bellflower stepped out of the Transportation Booth.

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"Mr. Bellflower, it's always good to see you. I can't imagine what sort of emergency you have in mind. But you know you have my support in the matter without asking." He drew Bellflower to the comfortable chair and went to the adjacent one. "Now, Mr. Bellflower, lets hear it."

"There is a remote possibility, Mr. President, that our research may have been rewarded."

"In what way, Mr. Bellflower?" asked the president sympathetically.

"We may have found out what's wrong with the transportation system."

In the face of presidential silence, Bellflower preserved a respectful attitude of waiting.

"You really know what's wrong with it?" asked the president at last.

"There's a possibility that something's wrong with the computer. The evidence is strong enough to suggest an investigation. The Federation people would be sure to insist on an investigation, in the face of the evidence I've seen."

"I see," the president said, relaxing. "Approximately how much additional funds do you think this will come to? Will we have to go back to the Federation right now, or can we swing the first part with what we've already been given?"

"The technicians think they can have it fixed tomorrow," said Bellflower.

Again there was silence, which began as though it might continue for eternity. Bellflower could appreciate the president's thoughts.

"In case they're right," Bellflower said, "we are confronted with some serious problems!"

The voice reached the president in his cave of shattered ambitions. He roused himself to the present. "I'm sorry, Mr. Bellflower. What was that again?"

"I say we may have a lot of problems on our minds. If these technicians are right, the problems involved in phasing out the SOC organization on Thyre Planet are going to have to be thought about right now. Do you realize how many people are involved? Do you realize the magnitude of this effect upon the lives of our citizens? Do you realize what an integral part of Thyrian life SOC has become?"

"I'm just stunned, Mr. Bellflower," said the president. "I'm sure you've done all you can. I need a moment to pull myself together."

"I knew you would be fully as elated as I am," said Bellflower.

"Yes, of course," said the president.

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Bellflower folded his hands and waited. The president's thoughts were now exploring all the unprofitable alternatives Bellflower's mind had already explored. Delicate sensibilities prevented them from being vocalized.

The one hope Bellflower had realistically glimpsed in his own analysis was fragmented on the character of the chief scientist himself, Dr. Nostran. There were probably several thousand physicists and mathematicians who could see the implications of the time machine implicit in Dr. Nostran's pifilin research. One of the stupid bastards would inevitably let the cat out of the bag in his enthusiasm, and the whole concept of continued Federation-sponsored research on Thyre Planet would go up the infinity tube.

"Well," said the president at length, "We can't be sure that this new plan or whatever it is will actually work, can we? There's a good chance it won't, isn't there?"

After the conference with the president, Bellflower called on Dr. Nostran. Dr. Nostran took the visit rather badly, as Bellflower had known he would.

VII

Test day came. The day in advance, all communications media warned the citizens to refrain from use of the Transportation Booths from 11:00 a.m. until the government gave the all-clear announcement. Eleven o'clock approached.

The president and Bellflower had run through their victory statements on the television prompters. The president's remarks began: "Citizens, the moment we have all prayfully hoped for so long has at last arrived." Bellflower began: "I cannot tell you, today, the pride I feel in having been instrumental in a small measure in the glorious events of this afternoon. But in a larger sense, no one man can claim credit for our victory, not even the beloved Dr. Nostran. The events today demonstrate once again that if you are willing to make a large enough committment of your treasure, no problem in the universe is too complicated for man to solve."

The alternative addresses, calling for renewed dedication and sacrifice, were also on hand in the unhappy event of failure.

The president, along with Bellflower and major political dignitaries, watched the TV coverage on a screen in the wall. Dr. Nostran had declined to attend the ceremonies, pleading urgent laboratory work.

The screen now showed technicians as they prepared to dis-

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connect the computer. "We're waiting now for you people out there to clear the Booths," said the announcer impatiently for the fifth or sixth time. "Please do not use the Transportation Booths! You could be seriously hurt or killed!" The camera studied flickering lights on the control panel. The announcer pleaded, "Please, tell everybody you know not to use the *Booths!* We can't shut off the computer until every last light goes off!"

This went on for approximately thirty minutes. Slowly, the number of lights decreased on the control panel until only a few were left. There was suddenly a moment when all the lights were off. "Now!" cried a voice. The board went dead. All transportation across Thyre Planet ceased. "I certainly hope we didn't catch anyone in the system at cut-off," said the announcer. "I thought I did see one light come on, just before the board went dead; let's hope not! Now, while the technicians replace the deficient unit, we will switch to the volunteers across the planet. Let's talk to these brave people."

The interviews with the volunteers went on seemingly without end. "Are you afraid, Miss Jones, to be one of the first to use the Booths after repairs?"

"They're going to send some kitties through first," she said. "If the kitties can make it, I'm willing to try."

The proceedings wore on. Only one small note of tragedy interrupted them. A special bulletin came on one hour and fifteen minutes after cut-off. "Ladies and Gentlemen. We have just received a report that a family of four are believed to have been caught in transit during cut-off of the Transportation Booths. Mr. Arnold Hutchins, 43, his wife, Mabel, age unknown, and their two children, Mary and Kathleen, seven and nine, all of 1700 Bentway Road, Aloseni, stepped into their Transportation Booth on their way to a local cinema at the exact time of cut-off. Police are now verifying the report, which was made by Mrs. Winifred Friendly, mother of the deceased wife, who was at the family home at the time and who witnessed the tragic development. The family had been watching television until just a moment before the disaster. Mr. Hutchins's last words upon entering the Booth are reported to have been, 'We still have a lot of time. This thing will go on for hours.'

"The Hutchins family and Mrs. Friendly, immigrants from the Extertian System, arrived on Thyre Planet three years ago and homesteaded the site at 1700

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Bentway Road, where they have lived since arrival. We have had no late word on funeral arrangements, but it is assumed by police that final details are still contingent on recovery of the four bodies."

It was slightly after 1:30 when the computer was reactivated, its original function restored.

At that instant, unaware of any time lapse since stepping into their Transportation Booths on their way back home from the world-wide annual picnic, the Thyrians emerged all across the planet. In physical appearance, they closely resembled the oriental race from the antiquity of Motherearth.

In the space of a heartbeat, through the residental areas of Thyre Planet, there were happy, holidaying Thyrians everywhere.

"What happened?" demanded the president as Thyrians slowly acquiring puzzled looks overlayed with confusion, began to appear before television cameras.

"Apparently," said Bellflower, they all got caught coming back from somewhere when the computer first went on the blink."

"Oh, my God!" cried the president, as the magnitude of the disaster became apparent. "How many of them are there?"

Bellflower said, "The latest figures I've seen from the Xenological Division was an estimate of about four billion."

Bellflower turned to the other dignitaries assembled in the president's suite. "Gentlemen," he said, his expression without emotion, "some of the blame for all this is mine for relying too heavily on the scientific staff."

Outside, the four billion Thyrians, together with the billion and a half Earthmen, the two races babbling incomprehensibly at each other, presented to the mind unquestionably the most tangled logistics problem ever encountered in the universe.

The president, in an awestruck voice said, "What do you think they will do when they find out we accidentally destroyed every single bit of tape recording on the planet — their history, their literature, their music . . . ?"

"They're going to be damned mad," one of the dignitaries said.

"Mr. President," the television technician said. "You're on."

From the television screen on the wall came the words, "Ladies and Gentlemen, the President of Thyre . . . "

Bellflower's thoughts turned to future challenges to his skill. He speculated on how the company who wrote his resumes for him would recount this latest success for the edification of future employer. —KRIS NEVILLE

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How nice to have a house that you can change at whim! How terrible to see it keep changing!

HOMESPINNER

by JACK WODHAMS

Heidi had dismantled the house again. No, no! God, how he hated change. Theo looked down at his feet, at the block set in the inch-long grass. The numerals 29. Yes, this was where his house was located.

He raised his eyes to view his home again. It was totally unrecognizable. Why, oh why didn't she leave it alone? He gave her too much leeway. Did he aim for realism too much? But so opposite! Heidi, Heidi, after a man had had a hard day feeding and elucidating fluctuations in Studi-Com he did not want to come home and have to do battle with a vastly altered domicile.

Theo sighed despairingly. Where had she put the front door This morning it had been smack-dab in the middle of a neo-colonial facade. She must have reduced the place as soon as he left. Now the house appeared to be an angled L-shape, in a later style with incongruous oriental embellishments. It was, Theo supposed, the most recent fashion fad.

He trudged around the right-hand side of the building. It was bad enough when she just chang-

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ed around some of the inside walls. She was never satisfied with anything for more than a week. Theo trudged on, shaking his head at his own uncanny knack of seeming always to be able to choose the wrong direction —

Theo came to what he conjectured to be the back door. He climbed duroplast steps, thumbed the ident. The door opened. At least she seemed to have hung one of them straight on its magstrip this time. He stepped into a strange kitchen, ignored the design and disposal of its furniture, headed for the outlet archway.

He next found himself in a room that had puce walls, a pink ceiling and a purple floor. Flikflims had been clipped at crazy angles to the walls, a whole three-dollar boxful by the looks of things. From the arrangement of selected appurtenances Theo was unable to decide whether it was a dining room, playroom or lounge. He shuddered. It looked terrible.

Click, click, click. Heidi's shoes. Always her stride sounded military. "Theo." And there was Heidi. "Don't say you don't like it! It's taken me all day, and I haven't finished yet."

"Heidi," he appealed hopelessly, "what's wrong with it the way it was?"

"I didn't like it. I got tired of it. You don't know what it's like staring at the same old walls every day. I wanted a change."

"But it's only three or four weeks since you changed it last. I thought you'd leave it that way for a while."

"I didn't like it," she repeated flatly. "What's wrong with a change now and then?"

"But so soon! Why didn't you tell me?"

"Because you'd have been against it," she said accurately. "What's the point of having U-Bild if you don't make a few changes occasionally?"

"Gradual changes, improvements, yes. But you alter the entire place." He gestured at the room. "Nothing here is the same."

"It is an improvement," she stated. "It is better than it was."

"What's it supposed to be?" he asked. "No, don't tell me, I'd rather not know."

"You don't appreciate me. You have no understanding," she said coldly. "You try to repress my creative instinct."

"Here we go again," he muttered. "Heidi, you *have* no creative instinct, and your taste gets worse all the time. You're not creating, you're copying. You're just scrambling after the latest thing they put through the matrices tuner. You're not resisting the under-pitch."

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"What do you know about creation?" she said. "You have no sensitivity, no flair! All day it's taken me, and what do you know about it? You are a stodge, a plebeian, a philistine."

"I want a home that stays reasonably still. Is that too much?" he said. "A place where I know where to find my shoes, where I know where the bathroom is, where I can find my way in the dark without walking into walls and tripping over things."

"You wouldn't change at all, would you?" she countered.

"No, I wouldn't," he agreed, capitulating. "Which way to the bedroom?"

"There is no bedroom. I have a geisha salon," she said coolly. "Your samurai cell is through there, past the tearoom on the left."

What was the use of arguing? He had only himself to blame, hadn't he? What alternative did he have? Separate rooms now!

Theo walked in the direction indicated, bowed and suffering.

"No appreciation," Heidi said. "No appreciation at all."

The bed was absent, the foam roll being placed directly upon the floor. The walls were decorated with large garish yellow slashes made by a spectro-sweep. The intention seemed to have been to achieve some semblance of picture-writing. It failed. Wardrobe flats had been converted into a concertina screen and ray-bathed to a greenish gold. Ray-bathed to a similar color also were the other furnishings in the room, a low li-back chair, a broad low table, a large chest with uneven spikes on the corners of its lid.

Theo dropped his case and sagged. As a youngster he had traipsed over the countryside with his father, an itinerant fruit-picker. Theo had worked, fought, to climb the social ladder. He had known apartments, caravans, dormitories, hotel rooms. Now he wanted a home. And he had a home that became transformed from time to time to an alien residence that robbed him of any sense of belonging.

He kicked the li-back chair. The rugged honeycombed featherweight arced a good two meters into the air, bounced off the wall and fell back to tumble for a while around the room.

Theo recollected all right, this morning the table had been blue, wider, longer-legged — and in the what? sewing room? Sewing! Who did sewing these days? Certainly not Heidi. That's if it was the same table. Theo cursed. So easy to reduce the old to a puff of powder, to refurnish with moldcraft for a few dollars.

Theo pushed up the glo-slide.

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The amber ceiling brightened to a streaky morning-sun yellow. The room did not benefit from the improved illumination.

Theo viewed it with mounting disgust. Taste and competence were absent. What had she called it, the samurai cell? It was an abortion. The umber walls had dark patches. The converter-ray coloring had been carelessly carried out unmasked on the spot and the silhouette of the li-chair was drawn in oily tints upon the floor. Slapped together, a daub, no finesse, no polish. It was not meant to be permanent. It could always be changed.

"I don't want it!"

Theo listened, momentarily shocked that he had uttered the thought so loudly. Then he said it again. "I don't want it!"

The house had been juggled around so many times that he could not differentiate between one and another. He remembered the zig-zag craze, and the curl-wall fad, and the V-A slope, and the not-so-long-ago multi-level with steps, steps, steps, up, down and everywhere. The wrinkle, the inner-pillar, the baroque, the Spanish, the marbled. Only parts could he recall. He had never *known* any of these homes, or had time to associate and meld his personality into their fabric.

Only one design could Theo remember in its entirety, and that was the very first one, the dream home he had selected from a catalogue. The demonstrators had first fashioned it on his base grid. Elegant, comfortable, soothingly tinted and pleasing to the eye, this home he could recall with pleasure.

Then had come Heidi, who had turned out to be far less amenable than he had anticipated. That first house had lasted two whole months before Heidi, learning and investigating, had started experimenting with "adjustments."

"I don't want it, and I'm not having it," Theo said, still somewhat surprised at the force behind his declaration. "I've had enough. God, where's the damned front door?"

Theo retraced his steps, noticed a narrow niche that led to the front exit, turned into it.

"Theo! What is it? Where are you going?"

The front door was stuck; he wrestled it open. "I'm collapsing the house," he said.

"What? Theo, you can't do that after I've spent all day . . . "

Unheeding, he crossed the bare patio and knelt by the track-liner control in the base-block.

Her crisp footfalls followed him. "Theo, you're not going to ruin everything I've done today?"

He glared at her. "I can't

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stand it, do you hear?" He unlocked the cover, slid it to one side. "I want a home I can live in. A home that doesn't keep making demands of me all the time." He reached forward to the roof cut-out switch.

"Oh, no, Theo, you can't! You know you don't like . . . "

Theo threw the lever across.

Holes appeared in the roof-ceilings and swiftly expanded from the center to the walls. The wall lever next. The coated particles, deprived of the motive power to maintain mutual repulsion, slowly sank together to the attracting force exerted by long thin trays. The ceiling trays came down with them, the connecting stays filaments coiling out into the floor along with the dead-power-leads to the lightning polarizer. The windows slid down in the melting substance and at bottom leaned back to slowly fall with light *phoomphs* onto the floor. Softly phoomph also went the doors, released by the mag-strip hinges, which themselves arched and toppled, having barely enough substance to tinkle. Flic-flims floated to the floor.

Now the base was level. Mold-crafted furniture and C-U boards assembled into various forms stood out, starkly exposed and naked-looking. Lustrmyst sinks and washbowls, their static pinning removed, lay upon their sides, their drainpipes bent and trailing. Water tubes, relieved of winding, unraveled and sent the spigots crawling sluggardly over the platform.

"No, no!" Heidi said. "Theo, how could you?"

"I want a proper home, and I'm going to see that it stays that way."

Theo pressed the floor-plan reference button. He still had an hour of twilight left. It would be enough time to set up the frame and roof — he'd take a day off and apply the finishing touches on the morrow.

Paying no mind to Heidi, Theo began to check the base grid. This was now criss-crossed with thin sub-surface lines of many colors each color representing a layout suggestion. The color Theo sought to follow was red. He had grown to detest house rearrangement, but now, very determinedly, he began to untack and re-align the wall trays himself.

"Now this," Theo said, "is a home."

"It's antique," Heidi replied stonily. "Obsolete. Architecturally archaic and unrewardingly over-simplistic."

"Heidi," Theo said, his voice edged with exasperation, "*I* like it. Doesn't that mean anything to you?"

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"Your taste is execrable," she said.

"Uhuh. You'll change it around again at the first opportunity, right?" Theo said.

"You don't expect me to leave it like this?" She waved a disparaging hand.

Theo rubbed the back of his neck. He had grown used to Heidi. She at least remained familiar to him. He didn't want to try again from scratch. It took so long. But . . .

Theo sighed. Better to make a clean sweep while he was about it and start afresh. Or maybe do without.

Theo went sadly to his valise and removed a little box.

"What are you going to do?" Heidi said.

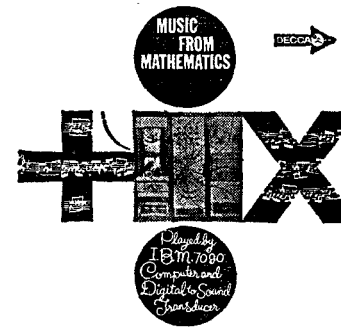
"Good-bye, Heidi," Theo answered regretfully, and shut a dial.

There was a shiver in his own mind, and Heidi became smoky. Her clothes fell to the floor as the flimsy tributaries from her five main stems became slack. Particles poured pinkly into her shoes, the main stems buckled, and the oval blob of Theo's subsidiary id responded, drooped down to rest upon the floor.

Theo was sweating. He felt, with some reason, that he had just killed part of himself.

God, how he hated change!

—JACK WODHAMS



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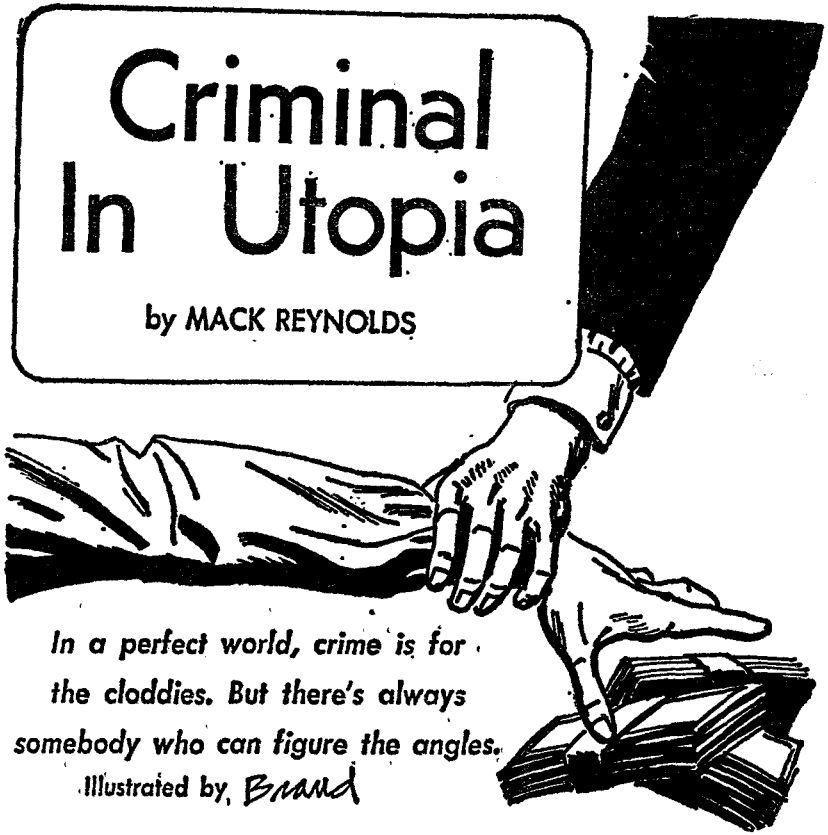
Criminal In Utopia

by MACK REYNOLDS



In a perfect world, crime is for the cloddies. But there's always somebody who can figure the angles.

Illustrated by, Brand

I

Rex Moran dialed his wrist teevee phone for the time and looked at the clock face that appeared on the screen. A robot voice said, "When the bell rings it will be exactly two minutes until eight hours." A tiny bell rang.

Rex Moran grunted and looked about the small apartment. He had better get going.

First, though, he took his Universal Credit Card from an inner pocket of his jerkin and in-

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serted it in the slot of his standard teevee phone which sat on his living cum bedroom's sole table. He said into the screen, "Credit balance check, please."

Within moments, a robot voice said, "Ten shares of Inalienable Basic. No shares of Variable Basic. Current cash credit, one dollar and twenty-three cents."

"One dollar and twenty-three cents," he muttered. "Holy living Zoroaster. I didn't think I'd have to start with that little on hand."

He dialed Credit and waited until a face faded in on the screen. It was a businesslike, brisk, possibly impatient, face.

"Jason May, here. Assistant Credit Manager, Inalienable Basic Dividends," he said.

Rex Moran put his Uni-Credit Card on the screen and said, "I'd like an advance on my dividends."

The other was seated at a desk. "Just a moment, please," he said and touched a button. He listened to a report on a desk phone screen then looked back at Moran. "You're already two months ahead."

"I know that," Rex Moran said doggedly, "but it's an emergency."

"It is always an emergency, Mr. Moran," the other said flatly. "What is the emergency? Your records show that you are almost invariably as far ahead as you can get on your monthly dividends. As you must know, the government charges interest on such advances. In the long run, Mr. Moran, you lose."

"I know, I know," Rex Moran said, an element of complaint in his voice. "I've had a long set of bad luck. One thing after another."

"What is the current emergency, please?"

Rex Moran wished he had thought this out in more detail before launching into his fling. He said, "I've got a sick brother, I have to go help."

"Where is this brother, Mr. Moran?"

"In Panama City."

"One moment, please." The other went back to one of his desk screens. In only moments, he looked up again with a sigh. "Mr. Moran, the computer banks have no records of you having a brother at all, in Panama City or anywhere else. Request denied. And Mr. Moran . . . "

"Yeah?" Rex Moran said in disgust.

"It is a minor offense to lie to a credit manager in attempt to secure an advance on dividends. I shall take no action on this occasion, but the fact will be entered on your record in the computer banks."

"Oh, great," Rex Moran growl-

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ed. He flicked off his screen. "I didn't expect that to work anyway," he muttered.

He thought over his plans for a few minutes, then squared his shoulders and dialed the local branch of the ultra-market, on his auto-delivery box. He was a man in his early thirties, mildly burly in build and with a not really unpleasant but a broken face of one who has either seen military combat, or perhaps been a pugilist. In actuality, neither was the case.

The ultra-market in the screen, he dialed the children's toy section, boys' toys, and then military type toys. He finally narrowed it down to guns and dialed one that came to only seventy-cents. It would have to do. He put his Uni-Credit Card in the slot, his thumbprint on the screen and ordered the toy.

Within minutes, it was in the auto-delivery box, and he put it in the side pocket of his jerkin. It was on the smallish side, but black and at any distance at all realistic enough for his purpose.

He moved over to his library booster teevee screen and dialed a newspaper, then the paper of two weeks previous, and the obituaries.

He went through several papers before he found the one that seemed most likely, by the address and the information in the item, and made some notes with his stylo.

Finally, he dialed the address and waited until a face faded in on his phone screen.

The other frowned at him, in lack of recognition.

Rex Moran said, "Mr. Vassilis? My name is Roy McCord."

The other was a tired looking obvious aristocrat, perhaps a few years the other side of sixty.

Still frowning, he said, "What can I do for you, Mr. McCord?"

"I just got back into town and heard the bad news. I'm a friend — forgive me, Mr. Vassilis — *was* a friend of Jerry Jerome."

The other's face lightened slightly and then went sad. "Ah, I see. I am afraid he hadn't mentioned your name, but then Jerome had many friends of whom I knew little."

"Yes, sir. I'd like the opportunity to offer my condolences in person," Rex Moran began.

The older man was frowning slightly and began to respond.

But Moran hurried on. "But I also have something of Jerry's that I suppose should go to you."

Rex Moran managed to look slightly embarrassed. "Well, sir, I . . . well, I think it would be better if I just brought it over."

The other was mystified. However, he shrugged. "Very well,

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young man. Let me see, I shall be free at, say nine hours this morning, and should be able to give you a few minutes."

"Fine, sir. I'll be there." Rex Moran switched off the screen before the other could say anything further.

For a moment he stared down at the blank screen, then shifted muscles in his shoulders. "First step," he said. "So far, so good. Maybe I shouldn't have used this phone, but in the long run it won't make any difference."

He didn't take the vacuum tube transport from his own building, knowing that a record was kept of all trips in the computer banks, and the john-fuzz might trace back later on his Uni-Credit Card number. Instead, he walked several blocks and entered a public terminal.

He looked up at the map and selected another terminal a couple of blocks from his destination, then entered the next twenty-seater going through that point. After putting his credit card in the payment slot, he realized that with the buying of the toy gun, he probably had only a few cents left to his balance. He didn't even have enough credit to get back to his apartment if this little romp pickled. What a laugh that would give the boys if he had to walk home.

He left the vacuum-tube transport terminal and walked to the building where Vassilis lived. This was the crucial point now. If there were others present, his plan had come a cropper. However, if he had read between the lines correctly, the senior Mr. Vassilis lived alone in his apartment in this swank neighborhood.

There was an identity screen on the front entry. Keeping his fingers crossed that his Universal Credit Card wouldn't be required for entrance, he said into the screen, "Roy McCord, on appointment to see Mr. Frank Vassilis."

The door opened, and he entered.

There were two elevators. He entered one and said, "The apartment of Frank Vassilis."

The Vassilis apartment was on the top floor but one. Rex Moran got out of the elevator, found a door with the Vassilis name on it and activated the door screen. When it lit up, he said into it, "Roy McCord, calling on Mr. Vassilis, by appointment."

The door opened, and he stepped through.

And came to a halt. The man standing there in a dark suit was not the Mr. Vassilis he had spoken to earlier on the teevee phone. This worthy was a stiffish type, of possibly fifty. His eyes went

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up and down Rex Moran superciliously, taking in the less than elegant suit, taking in the rugged features.

He said, "Yes, sir. Mr. Mccord? The master is awaiting you in his escape room."

The *master?* Holy jumping Zoroaster, Vassilis had a man servant. Whoever heard of personal servants in this day and age? The obituary had hinted that the old boy was upperclass, but Moran hadn't been thinking in terms of something so rich as an establishment with a servant.

However, he followed along. It was the largest apartment he could off-hand ever remember being in. They went down one hall, turned right and down another one.

There wasn't even an identity screen on the door before which they stopped. The servant knocked gently and opened the door before there was any reply. Evidently, old Vassilis was expecting him, all right.

The servant stood stiffly and said, "Mr. McCord."

The elderly man Rex Moran had talked to on the teevee phone earlier looked up from where he sat in a comfort chair, a small magnifying glass in one hand, a dozen or so stamps on a small table before him. He was evidently a philatelist.

He said, "Ah, yes, Mr. Roy McCord, Jerome's friend. Please come in." As the servant had before him, he took in Moran's clothing and general appearance, and his eyebrows went up slightly. "Now, what is it I can do for you, Mr. McCord?"

Rex Moran looked at the servant.

Vassilis said, "That will be all, Franklin."

Franklin turned and left, closing the door quietly behind him.

No need to mince around. Rex Moran brought the toy gun from his pocket briefly, let the other see it, and returned it to his side pocket, but still holding it in his hand.

He said, "This is a romp, Mr. Vassilis."

The other goggled at him. "You . . . you mean you are a thief? That you got into my home on false pretenses?"

Moran let his face go empty. "I wouldn't put it that way. Let's just say that I'm tired of not getting my share of the cake. And since the powers that be won't give it to me, I'm taking it."

The old man stared at him. "You are a fool, young man."

"Maybe, maybe not." Rex Moran jiggled the gun in his side pocket, suggestively.

"Being a thief doesn't make sense in this day. Society has

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made arrangements to defend itself against the thief. There's not enough profit in petty crime to pay off."

Rex Moran grinned at him sourly. "I didn't exactly have petty crime in mind, Mr. Vassilis. Now, hand me your credit card."

"What other kind of crime is possible? Nobody but I can spend my dollar credits. I can't give them away, gamble them away, throw them away, be cheated out of them. Only *I* can spend my dividends."

"We'll see about that." Rex Moran nodded. "Now, let's have your Universal Credit Card." He jiggled the gun in his pocket again.

The older man contemptuously took a beautiful leather wallet from an inner pocket and brought forth a standard Uni-Credit Card. He handed it over.

Moran said, "You have a vacuum delivery box in this room? Oh, yeah, here we are. Zoroaster, look at the size of it! Now that's the advantage of being an upperclass like you, Mr. Vassilis. You should see the teeny auto-delivery box in my mini-apartment. If I want anything of any size at all, I've got to use the box down in the lobby of the crummy building I'm in. Now, with a nice big auto-delivery box like this anything you wanted would have to be really super-size before you couldn't get it delivered right here into your escape room."

Vassilis said, "You are a fool, young man. The officials will be after you in no time flat."

Moran grinned at him and sat down before the box, keeping one eye on the other. He put the card in the teevee screen's slot and said, "Credit balance, please."

A robot voice said, "Ten shares of Inalienable Basic. Two thousand and forty-six shares of Variable Basic. Current cash credit, forty-two thousand and twenty-nine dollars and eighteen cents."

Rex Moran whistled. "Two-thousand - and - forty-six-shares-of-Variable!"

Vassilis grunted contempt of him.

Moran dialed the ultra-market, then sports, then firearms, then handguns. He finally selected a .38 Recoiless and dialed it and a box of cartridges.

He thought for a moment, then dialed photography and selected a Poloroid-Pentax and some film for it.

"Might as well do this up brown," he said conversationally to the older man. "Might as well put a *generous* hole in that credit balance."

"There'll be no hole — as you

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call it — at all," Vassilis said bitterly. "When I report this thievery, the authorities will return to my account the sum involved in any deprecations you have performed."

Rex Moran dialed men's clothing and took his time selecting a full outfit, including shoes.

"Now, this is the crucial point," he said thoughtfully, to no one in particular. He dialed jewelry and finally selected a two-thousand-dollar diamond ring.

"I guess that's it," he said. Then, "Oh, one other thing." He dialed sports again, and camping, and eventually a length of rope.

He turned back to Frank Vassilis. "And now, old man, come on over here and stick your thumbprint on this order screen."

"Suppose I refuse?"

Rex Moran grinned at him. "Why should you? Like you said, when you report this, the authorities will return your credit dollars to you and come looking for me. You're not losing anything."

The older man, grumbling, came erect in his chair. He came over to the auto-delivery box and, with a sneer of contempt for his intruder, stuck his right thumb print on the screen.

Moments later, the articles had arrived.

Vassilis returned to his comfort chair.

Rex Moran began fishing the articles he had ordered from the box. He loaded the gun, put it next to him, within handy reach and then dressed in his new clothes. He took up the camera and slung it over his shoulder. He looked at the ring admiringly and tucked it away in an inner pocket, and then the gun.

He muttered, "I have half a mind to order a few more of these but that big a drain on your account all at the same time might throw some relays and have the computer people check back."

"*Thief,*" Vassilis said bitterly.

Moran grinned at him. "What's your beef? It won't be you who loses."

He took up the rope. "First we'll tie you up a bit, old chumpal, and then we'll call in Franklin, or whatever you called him, and do a job on him."

"You'll never get away with this, you young cloddy," the old man bit out.

"Famous last words," Moran grinned back at him.

II

Back on the street, he realized it was going to be necessary to walk to his next destination. His credit standing simply did not allow even such a small sum as riding in the vacuum tubes. However, happily, it wasn't as

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far as all that. As he walked, he took the toy gun from his pocket and threw it into a waste receptacle. He had the real thing now.

He found the neighborhood and had a choice of three alternatives. He took the smallest of the shops and entered.

There were even a few display cases. How anachronistic could you get. He grunted sour amusement to himself; here was the last of the kulaks, the last of the small businessmen.

A quiet man of about fifty entered from a back room and took Rex in before saying in a soft voice, "Yes, sir, what can I do for you?"

Rex Moran went into his act. Hesitantly, he said, "I understand that you sometimes buy personal property."

"That is correct. Buy and sell. But what type of property, Mr. . . . ?"

"Adams," Rex Moran said. "Timothy Adams. I have a ring that used to belong to my mother. It is of no value to me, now, and I thought . . . well, I might as well realize what dollar credit value it has."

"I see. Please sit down, Mr. Adams. Heirloom jewelry is a bit of a drug on the market, but we can take a look." He sat himself behind a desk and motioned to a straight chair.

Rex Moran sat down and brought the diamond ring from his pocket and proffered it. The other took it and set it on the table. He looked at Rex Moran thoughtfully. "This is a very modern setting, Mr. Adams. I had gained the impression that it was an older piece your mother had left you."

"Oh, no," Rex Moran said. "She bought it not too very long before she died. If I had a wife, or someone, I might give it to her, but I haven't."

The other looked at him evenly. "Mr. Adams, I am not a fence, you know. This is a legitimate business."

"Fence?" Rex Moran said blankly.

"I buy and sell such items as art objects and jewelry, but I do not receive stolen goods. Where did you say your mother bought this?"

"On a vacation in Common Eur-Asia. In Budapast, I think, or possibly Belgrade."

"So it would be untraceable here in the United States of the Americas."

"Why, it never occurred to me."

The shop owner took up the ring and looked at it thoughtfully. He brought a jeweler's glass from a drawer and peered through it.

He put it down finally and

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looked at Rex Moran. "I'll give you two hundred dollars for it."

"Two hundred dollars! My mother said she paid more than two thousand."

"Then she paid too much. The markup on jewelry is very high, Mr. Adams, and such items as this can take a very long time to move."

Rex Moran thought about it. "Make it three hundred."

The other considered that. "Very well," he said finally. "But I am making a mistake."

"Yeah," Rex Moran said sourly. He brought his Uni-Credit Card from his pocket and stuck it into one of the slots on the other's Exchange Screen.

The shop owner put the ring in a drawer, brought forth his own Universal Credit Card and put it into the other exchange slot. He said into the screen, "Please transfer the amount of three hundred dollars from my account to this other card."

A robot voice said, "Transfer completed."

Rex Moran retrieved his Uni-Credit Card and came to his feet. "I still think I was robbed," he muttered.

The other said nothing, simply sat there and watched after him as Rex Moran left the shop.

Well, he now had three hundred dollars to his account.

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That was a damn sight less than he had expected to get. However, he hadn't dared buy a more expensive piece of jewelry than the two thousand dollar piece, on Vassilis' credit card. There would have been more of a chance of the shop owner checking on such an item. More chance of it being able to be traced. Besides, if he had drained Vassilis' account too badly, there might have been a computer check at that point.

He strode rather rapidly to the nearest vacuum-tube transport terminal and into it, wanting to get out of the neighborhood as quickly as possible. He took a two-seater vehicle to the downtown area of the pseudo-city, if a pseudo-city can be said to have a downtown area.

When he left the vacuum tube, it was to emerge in the vicinity of several restaurants. It was just about noon, but since he hadn't been able to afford breakfast, he was feeling hunger. Well, three hundred dollars was three hundred dollars, and he might as well blow himself to a fairly good repast in an auto-cafeteria.

He selected one and sat himself down at a table and stared down at the menu listed on the table top. To hell with anything based on Antarctic krill, plankton protein, or soy beans; he was up to some real animal protein and Zoroaster could take the cost.

He put his credit card in the table slot, his thumbprint on the screen and dialed chicken and a mug of sea-booze. He would have liked a shot of pseudo-whisky to begin, but his funds weren't that unlimited.

His wrist teevee phone buzzed.

He looked down at it in some surprise. He had it set on Number One Priority, and only two people in the world were eligible to break in on him on that priority, and he certainly was not expecting a call from either.

But there was a strange face in the tiny screen. Strange and severe.

The voice said, "This is Distribution Service, Subdivision Police. Rex Moran, you are under arrest for attempt to violate regulations pertaining to useage of the Universal Credit Card. Report immediately to the nearest Police Administrative Station. Failure to do so will compound the felony."

"Get lost, fuzz-john," Rex Moran snarled. He snapped the instrument off, then stared down at the blank screen in dismay. What had gone wrong? Especially, what had gone wrong so quickly? It had to be something to do with his selling that damned ring. But what? He had expected the ring to stay in that

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tiny shop, waiting for a customer for months, perhaps even years. And even then, when it was resold, the transaction should never have appeared on the computer records, except as an exchange of dollar credit from the purchaser's account to the shopkeeper's.

What foul luck! Vassilis must have put in an immediate alarm, and the police must have contacted every place in town where Rex Moran could possibly dispose of the purloined ring.

He had to think fast. They'd be after him now. Damn and double damn. He wouldn't even be able to return to his mini-apartment. He was on the run, and for a meaningless amount such as three hundred dollars, and even that now was of no use. He wouldn't dare use his credit card; the computers were surely watching for him.

They could also zero-in on his wrist teevee phone. He reached down, in disgust, and began to rip it off. However, the screen lit up again, and a new face was there.

A voice rasped, "Now hear this, all citizens. Crimes against the government of the United States of the Americas have been committed by Rex Moran, including assault, robbery, sale of stolen property and attempted misuse of the Universal Credit Card. All citizens are requested to cooperate in his apprehension. The criminal is dangerous and armed. Here is his face."

Rex groaned when his face appeared on the tiny screen. Happily, it was a fairly old photo, and taken before some of his present scarred features had become what they were.

He ripped the instrument from his wrist and flung it into a corner. At this early hour there were none others present in the auto-cafeteria, thank the living Zoroaster for that.

He came to his feet and hurried for the door. In the far distance, he could hear a siren. Undoubtedly, it was for him. You didn't hear police sirens that often in the pseudo-cities of the Ultra-welfare State.

He hurried down the street and turned a corner as quickly as possible. He dared not use the vacuum tube. He dared not summon a floater, for that matter.

But that brought something to mind.

He found a fairly isolated spot and waited until a pedestrian came along. He brought his gun from his pocket and said, "Hold it, chum-pal."

The other looked at him down at the gun, up into Rex Moran's face again and blanched. "Why,

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why you're the criminal just flashed on the teevee."

"That's right, chum-pal, and you look just like the sort of chum-pal who'd cooperate with a man with a shooter trained on his tummy."

The other was wide-eyed and ashen. "Why . . . why, of course."

"Okay. Quick now, dial a floater on your wrist teevee phone."

"Of course, of course. Don't be nervous."

"I'm not nervous." Rex Moran grinned at him and jiggled the gun up and down. "Hurry it up."

The other dialed, and within moments an auto-floater cab turned the corner and pulled up next to them at the curb. The door opened.

Rex said, "Quick, put your Uni-Credit Card in the slot."

Even as the other was doing so, Moran was climbing into the back seat of the floater. He rasped, "Put your thumbprint on the screen." While the other did that, Rex Moran was dialing his destination, not letting the other see.

He reached out suddenly and grasped the other's wrist teevee phone and ripped it off and stuck it in his pocket. He pulled the credit card from the floater's slot and handed it back to his victim.

"There," he said, "don't say I didn't do you a favor. Think of all the trouble you'd have if you didn't have a credit card."

He slammed the door shut and the floater took off.

Rex Moran said into the vehicle's screen, "Maximum speed, please."

A robot voice said, "Yes, sir."

He couldn't afford to stay in the floater for very long. Just enough to get out of this neighborhood. As soon as that cloddy he had just stuck up back there reported to the police, they'd check through the computers for the floater's destination. There'd be a record, based on the number of the victim's Uni-Credit Card. A record of *everything* seemingly went into the computer banks. Why not? He growled sourly; evidently there capacity was almost infinite.

Yes, they'd check the destination of his trip. However, he was not quite so silly as to go all the way to the destination he had dialed. About half way there, at a traffic control stop, he opened the door and left the floater to go on its own.

He ducked down a side street and took off at right angles to the avenue along which the floater was progressing.

Rex Moran now had a double problem. He grimaced wryly. An *immediate* double problem,

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that was. For one thing, he was still hungry. For another, he had to get off the streets. Citizens weren't apt to pay overmuch attention to the Distribution Service police calls over the teevee phone screens, but there was always the exception. Given time, someone would spot and report him, in spite of the poor photograph which just had been broadcast.

He could hear the stolen wrist teevee phone buzz in his pocket and brought it forth, flicking the tiny stud which prevented it from transmitting his face.

It was the same official as before, and he was making the same broadcast, but now reporting Rex Moran as last seen in that part of town where he had dialed the floater. Evidently, his victim had reported.

That also meant they would know that Moran had the stolen wrist teevee phone and would shortly be zeroing in on it. He threw the instrument into the gutter and ground a heel down on it.

He had to get off the streets.

And suddenly he knew where to go.

In this vicinity there was a posh restaurant of which he had heard but had never been able to afford, nor had he really ever expected to be able to afford it. Well, things were different now.

He entered the building and took the elevator to the penthouse restaurant known as the Gourmet Room. The day was more advanced now, and upper-class office workers were beginning to stream in for the midday meal.

He avoided looking impressed at the ostentatious swank of this rendezvous of the ultra-wealthy and thanked his stars that he had thought of acquiring his present clothing. A headwaiter approached diffidently. In all his life, Rex Moran had never eaten in a restaurant which boasted live waiters. Now he tried to look unimpressed.

"A single, sir?" the maitre d'hotel said.

"Please," Rex Moran told him, keeping his voice softly modulated and as though such surroundings were an every day affair for him. "If possible, a table set back somewhere. I have a bit of figuring to do."

"Certainly, sir. This way."

He was seated in an out of the way alcove which suited his needs perfectly.

The maitre d' snapped his fingers, and a waiter scurried up.

There was no menu. It was that kind of a restaurant.

The maitre d' said unctuously, "Sir, today the *Gratin de langoustines Georgette* is superb."

Rex Moran hadn't the vaguest

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idea what *langoustines Georgette* might be, but he made a face as though considering.

"What else might you recommend?" he said.

"The chef has surpassed himself with the *poulet docteur*."

"That sounds good."

The waiter made a note.

"And a half bottle of Sylvaner of the Haut-Rhin, perhaps?"

"Fine."

Salad and dessert were settled upon, and then the maitre d' and the waiter were gone.

Rex Moran sighed inwardly and looked around. The only other diner within his immediate vicinity had his back to Moran.

He unslung the Poloroid-Pentax from his shoulder and brought from his pocket the cassette of film. He inserted it in the camera. Then he took from his inner pocket the Universal Credit Card he had appropriated from Frank Vassilis and examined it with care, spending particular time on the thumbprint.

Finally, he propped the card against the small vase in the table center, which held a single black rose, and focused the camera on it. He clicked the shutter then drew the photo from the camera back and stared at it. It didn't quite do. He tried again, getting the camera closer to the subject. He took half a dozen shots before he came up with as

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near a duplicate of the Universal Credit Card's thumbprint as he could hope for.

He put the credit card away, the camera back in its case, and brought forth his penknife. He was busily trimming the photo to be the exact size of a thumbprint when the waiter turned up with his first course.

Poulet docteur turned out to be the best chicken dish he had ever tasted. And the wine was excellent.

In the middle of his salad course, and before dessert, he came suddenly to his feet and hurried toward the reception desk cum cashier's booth. It was there that the payment screen for the ultra-swank restaurant was to be found.

And it was there that the maitre d'hotel stood his eyebrows politely raised now.

Rex Moran said to him hurriedly, "I have just thought of something I must attend to. Please hold my dessert for me. And, please, keep an eye on my camera over there, will you?"

The maitre d' looked over at Moran's table. The camera sat upon it. He said, "Why, of course, sir."

Rex Moran left, still projecting an air of a suddenly remembered matter that must urgently be taken care of.

Down on the street he grimaced. One camera sacrificed to the game. However, he had no need of it now.

He was still in one of the best sections of town. He made his way toward a nearby hotel, holding a handkerchief over his face, as though trying to extract something from his left eye. There were quite a few pedestrians at this time of the day.

In the hotel, he approached the lone clerk at the reception desk. Now, he had to take his chances. If the man recognized him from the police broadcast — Rex Moran was on a spot.

He said, "I would like a small suite. Nothing ambitious. Living room, bedroom, bath. I doubt if I'll be entertaining."

"Why, yes sir, of course." The other looked beyond Moran. "Ah, your luggage, sir?"

"I have no luggage," Rex Moran said, off-handedly. "I just came in from the coast. Plan to do some shopping here for my wardrobe. Always buy my things here in the East. California styles are ludicrous."

"Yes sir, of course." The clerk motioned in the direction of the teevee screen slot on the desk. "Would you wish to register?"

"I'd rather see the suite, before deciding," Rex Moran said. "I'll register up there, if it's satisfactory."

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"Oh, I'm sure it will be, sir. Let me suggest Suite Double A."

"Double A," Rex Moran said and made his way to the bank of elevators.

Inside the first elevator, he said, "Suite Double A."

"Yes, sir," a robot voice said.

Suite Double A was several stories up. Rex Moran emerged from the elevator, looked up at the direction signs on the wall and made his way to the suite in question.

It was quite the most elaborate quarters in which Rex Moran had ever been. Not that that was the issue, he would have taken the accommodations whatever they had resembled.

He approached the room's teevee phone screen and said into it, "This suite seems adequate, I'll take it."

A robot voice said, "Very good, sir. If you'll just put your Uni-Credit Card in the slot."

Rex Moran took a deep breath. He brought the card of Frank Vassilis from his pocket, inserted it in the slot. Then he brought forth the photo he had taken of the Vassilis right thumbprint and laid it on the screen. He picked it up again, immediately.

A robot voice said, "Thank you, sir."

Rex Moran took another deep breath and let it hiss out again between his teeth.

"Zo-ro-as-*ter*. I think it worked."

III

He dialed the time. It was mid-afternoon.

He grinned exuberantly. He had it licked. Unless there was something he didn't know about, he absolutely had it licked.

He dialed Service and said into the screen, "I'd like to lay in a stock of potables. Let me see. Let's say a bottle of Scotch, one of cognac, one of Metaxa, one of Benedictine, one of Cherry Herring, one of Chartreuse — yellow, of course, not the green — one of Pernod, absinthe if available but otherwise the ordinary will do."

A robot voice said, "Sir, in the New Carlton all these can be dialed on the auto-bar."

"I know, I know, but I like to mix my own."

"Very good, sir. They will be delivered through the auto-bar, sir."

"Mind," Rex Moran said, "the very best quality."

"Always, sir."

Still grinning widely, he went over to the suite's auto-bar and took up the bottle of Glengrant Scotch and held it up to the light approvingly. In his whole life he had been lushed-up exactly once on Scotch. The stuff was

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worth its weight in rubies since Central Production had discontinued the use of cereals for beverages.

He dialed for soda and sipped away at it approvingly, even as he strode up and down the room, considering his immediate future.

He wondered briefly how you went about getting a mopsy up to your quarters in a hostelry as posh as the New Carlton. But he had better draw the line there, anyway. It was no use pushing your luck. Some wheel might come off. She might have seen the police teevee alarm on him.

What the hell else was there in the way of unrealized lifelong ambitions?

Caviar. He had never had his fill of caviar. In fact, the amount of caviar he had eaten in his whole life could have come out of a two ounce jar of the precious stuff.

Fine. He dialed Service again and had a pound jar of caviar sent up, along with sweet butter, toast, chopped eggs and chopped onion. While he was at it, he ordered a large amount of smoked sturgeon and smoked salmon.

While he waited for this order, he built himself another Scotch and soda. Glengrant. He'd have to remember that name, on the off chance that he'd ever have another opportunity such as this.

He spent the rest of the day indulging himself in every food and drink ambition he could ever remember having had. And in getting well smashed and surfeited with rich edibles to the point that when dinner time arrived, he had no appetite, to his disgust He wanted to order a real gargantuan meal.

His last vague memory was of staggering into the bedroom and dialing the bed to ultimate softness before throwing himself into it.

In the morning, he should have awakened with some sort of hangover, but the gods were still with him; either that or there was another good mark to chalk up for Glengrant whiskey. He awoke grinning up at the ceiling. He had slept like a log.

He dialed the time at the bedside teevee phone and didn't bother to look into the screen at the clock. A robot voice said, "When the bell rings it will be exactly nine minutes to eight hours."

Ha! Nine minutes to go.

He dialed breakfast, a monstrous breakfast, and had it delivered to the auto-table next to the bed. Fresh mango juice, papaya, eggs in black butter, cavair again, toast, fried tomatoes, coffee; double orders of all.

Groaning satisfaction, he ate.

By the time breakfast was

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over, it was past eight o'clock.

All right, he grinned jubilantly, time to get busy.

He went to the teevee phone screen and dialed the local branch of the ultra-market and men's furnishings. He took his time selecting a new change of clothing. That accomplished, he dialed the order, put Vassilis' card in the slot and laid the photo of the thumbprint on the screen and took it off again immediately.

The clothing arrived in minutes, and he dressed after showering and shaving in the bathroom.

He returned to the teevee phone screen and dialed the ultra-market once again. He began ordering items, in fine discrimintion, and had the time of his life upwrapping and examining them as they arrived. His loot piled up.

At about ten o'clock, he decided to really do it up brown and dialed a floater sales outlet. He ordered a sports model private floater and instructed them to send it over to the hotel's parking area on automatic.

At ten minutes after ten, the identity screen on the door lit up. There were two men there, one in uniform.

The one in plain clothes said disgustedly, "All right, come along."

The one in uniform looked at all the purchases strewn around the room, wrapping paper and string everywhere. "Zoroaster," he snorted.

They took him down the elevator, through the lobby, out to the street where a police floater awaited. The uniformed one drove manually. Rex Moran sat in the back with the other.

The plainclothesman said sourly, "You must have had the time of your life."

Rex Moran laughed.

"Big joke," the other said. "We almost nabbed you there in the auto-cafeteria. We should have zeroed-in on you, instead of trying to arrest you by teevee phone."

"I wondered why you didn't," Rex Moran said. "Police inefficiency."

They took him to the local offices of the Bureau of Distribution Services, to an elevator, and then to the third floor where he was ushered into the presence of Marvin Ruhling himself.

Ruhling looked at him and said, "Very funny, ordering even a sports floater."

Rex laughed and took a chair. The uniformed policeman left but the plainesclothesman also sat down. His face was as disgusted as that of the Supervisor.

Marvin Ruhling said, "Holy jumping Zoroaster, what kind of heat do you think Vassilis is going to stir up?"

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Rex Moran said reasonably, "Never let him know what really happened. He wasn't doing any harm. He had a little excitement."

"A little excitement, you damn cloddy. Suppose he had dropped dead of a heart attack or something? Not to mention that pedestrian you forced at gunpoint to get a floater for you."

Rex said, "Well, you asked for it. You wanted authenticity. You got it."

"Authenticity," the plainclothesman grunted disgustedly. "Which reminds me, we better get that teevee police broadcast killed, or the next time Rex goes out on the street somebody'll shoot him."

Ruhling said to Rex Moran, "Well, your conclusions?"

"That we've got to do something to the cards. Something to guarantee the thumbprint is legitimate. Otherwise, a real bad-o could locate some upperclass cloddy without any immediate friends or relatives, take him out somewhere and finish him off and hide the body, then take the Uni-Credit Card and head off into some other part of the country and, using the same system I did, duplicate photographically the thumbprint. And for the rest of his life he could milk the dividends that would accrue on the upperclass cloddy's credit account from his Variable Basic."

Marvin Ruhling looked at him sourly. "What could we do to the credit cards?"

"Search me. That's up to the engineers. Maybe something in the card, or on the screen, to detect body heat. I don't know. But I proved the cards vulnerable the way they are."

"What else?"

Rex Moran thought about it. He shook his head. "I just mentioned it to Fred, here, on the way over. That system of making a citizen arrest himself and turn himself over to the nearest police station doesn't wash. Oh, I admit it saves manpower, ordinarily, but when you get a cloddy vicious enough to be carrying a shooter, then you should zero-in on his wrist teevee phone, assuming he's silly enough to be carrying one, without warning."

"Rex is obviously right on that one," the plainclothesman said.

Marvin Ruhling sighed deeply. "All right," he said. "You won your bet. You were able to beat the rap, exist in comfort for a full twenty-four hours, without any dollar credits."

He glared at his underling. "But I'd sure as the holy living Zoroaster like to see you do it six months from now, when I've cleared up some of those loopholes you used."

Rex Moran grinned at him. "It's a bet," he said.

—MACK REYNOLDS

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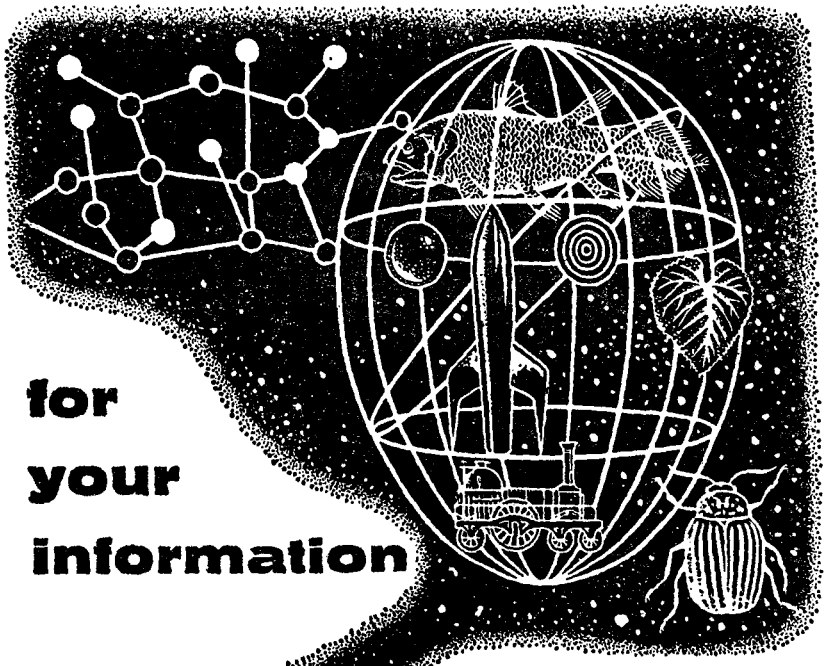
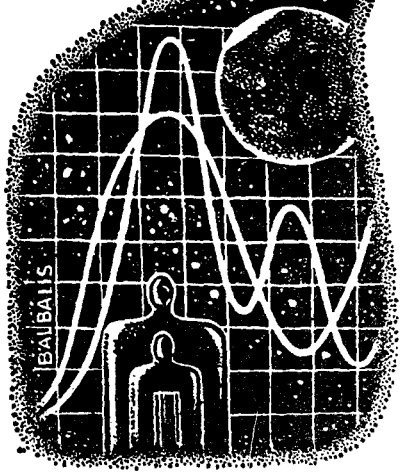


for your information

BY WILLY LEY

THE ORBIT OF EXPLORER - 1

On the evening of January 31, 1968, a cocktail party took place in a hotel in Washington, D.C. Cocktail parties for one reason or another are anything but rare in Washington, but this one had a special meaning. It was held in celebration of the tenth anniversary of the launching of Explorer-I, the first American



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artificial satellite which had reached orbit about one hour before midnight on January 31, 1958. What made the celebration even more joyous was the fact that Explorer-I is still in orbit; it is (and has been for a number of years) the oldest orbiting satellite.

Everybody who had had anything to do with the project — including some who, like me, had only contributed moral support — was present, and the room reverberated with reminiscences. On that historic night ten years earlier, the Explorer team had been split, General John B. Medaris, commanding officer of ABMA (Army Ballistic Missile Agency, Huntsville, Alabama) and Dr. Kurt Debus, the launch chief, were at Cape Canaveral, while Wernher von Braun (then of ABMA and responsible for the rocket) and William H. Pickering (of the Jet Propulsion Laboratory in Pasadena and responsible for instrumentation) were in Washington. That was a day where the long-lines department of the telephone company showed a peak profit.

Actually the rocket, dubbed Jupiter-C No. 4, had been ready on January 28; but the shot had to be delayed for three days because of unusual weather in the low stratosphere. There a steady current of air, called the jet stream, crosses the United States, going from west to east. While it is always present, its speed is not always the same; and while it always blows from west to east it does not do so over the same latitude all the time. Sometimes it is much farther north than at other times.

During the latter part of January, 1958, it happened to be farther south than normal, namely over Florida, and the long thin Jupiter-C rocket might be broken in two if it entered the jet stream on a day when the jet stream was especially fast. It was quite clear that the shot could not be risked on either January 28 or 29. On the 30th, the jet stream was still over Florida, but it had slowed down a bit, to "only" 220 miles per hour. General Medaris ordered the rocket to be made ready except for the liquid oxygen which is always put into the tank last. Meanwhile the speed of the jet stream had been ascertained by meteorological balloons and the computer at ABMA produced an analysis. Medaris received a report saying *highly marginal — we do not recommend that you try it* and ordered a one-day postponement. The next day the jet stream began drifting northward; and the outer portion, still over Florida, moved at the rate of 110 miles per hour; and that

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was a speed through which earlier Jupiter-C rockets had been flown without harm either to the rocket or to the results. It could be tried. Lift-off was 10:48:16 PM Eastern Standard Time.

People involved in countdowns always say that the last twenty minutes are the worst. By that time everything that needs doing has been done, and therefore everybody has twenty minutes in which to think of what may not have been done, or else what could possibly go wrong. Needless to say, the essence of these twenty minutes is compressed in the last two minutes, but jiggly nerves can return to normal two minutes after lift-off, if nothing has gone wrong by then. Five minutes after lift-off, orbit has been attained and all's well. This is how things stand now, but Explorer-I was the first such shot. Nobody could claim that he had any experience with satellite launches. And the instrumentation was incomplete then.

At about ten minutes after lift-off, the people on the ground at the Cape and in Washington only had two figures. One was the height above sea level of the satellite, which was 224 miles, more than enough for a good orbit. The other figure they had was the velocity, which also was enough for a good orbit. But what the incomplete instrumentation did not tell was whether the top stage, and with it Explorer-I, moved in the right direction. The right direction was slightly up from the horizontal; the distance between satellite and the earth's surface had to increase for half an orbit. But it was possible, yes, unfortunately it was possible that the motion was slightly down, which would produce a fiery re-entry a few thousand miles to the east, in a place where it could not even be spotted.

"And then we waited!" somebody said across his glass to a few people whose worst experience in waiting had been for an airliner delayed by bad weather or heavy traffic.

In the case of this particular countdown the worst waiting came *after* the lift-off. The Russians had put two heavyweight satellites into orbit, Sputnik-I on October 4, 1957 and Sputnik-II on November 3, 1957. They were rumored — correctly as it turned out — to be preparing Sputnik-III which was to be heavier than the first two put together. The United States had countered with Project Vanguard and *that,* at the moment, was the most publicized failure in history. The first Vanguard rocket had been finally ready

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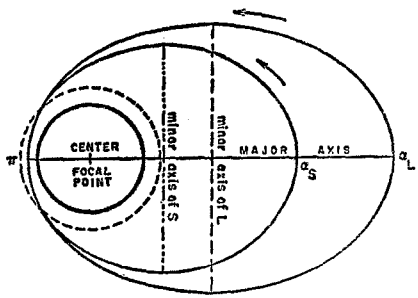

Fig. 1. Two satellite orbits having the same perigee altitude. For explanation see text.

for the final ulcer-producing countdown in the morning of December 6, 1957. At 11:44:35 AM it lifted off the launchpad, for just about one yard. Then it lost thrust, settled back, fell over and exploded.

The more nervous members of the Explorer team felt that the Vanguard men had still been a little better off; at least they had known immediately that they had a failure on their hands. The Explorer team had to wait for about 1½ hours until they could know whether they had been successful or not. Of course the time when the big radar at Goldstone in California should catch Explorer-I had been calculated, and when that time came the crew at Goldstone remained silent. The reason became known soon — Explorer-I had gone into a somewhat larger orbit than calculated; naturally it needed more time to complete it. By the time Goldstone could say that Explorer-I was in orbit, it was a new day for the Cape and for Washington, though not yet on the West Coast.

As has been said in the opening paragraph, Explorer-I has been orbiting ever since, with its behavior such that it produced a veritable textbook example of a very slow but steady 'orbital decay.'

As everybody knows, most artificial satellites go through a shrinking orbit and finally re-enter the atmosphere, where aerodynamic heating vaporizes them. While this is general knowledge after ten years of news stories about artificial satellites, the reason for this eventual re-entry is generally not known, as I find out several times per year from questions asked of me after lectures. Many people seem to think that it is only 'reasonable' that gravity wins out at the end.

The actual victor is our atmosphere.

Look at Fig. 1. There we have a large elliptical orbit with its apogee at alpha-L (for "large"). The perigee is supposed to be inside the atmosphere at 125 miles or so where air molecules still get in the way of an orbiting satellite. In accordance with Kepler's Second Law the velocity of

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a satellite is highest at perigee and lowest at apogee. Each time the satellite goes through its perigee it has to fight residual air resistance. The result is a small loss of kinetic energy, or momentum, and the result of this loss is that the satellite, on its next orbit, does not go quite as far out as it did on the previous orbit. While the apogee approaches the ground slowly, the perigee stays at about the same altitude.

After some time, say three years, the orbit will look like the smaller ellipse with apogee at alpha-S (S for "small"). The new orbit is not only smaller; it also has become more circular in shape. In the end, the orbit does become a circle, with all of its length in the upper atmosphere and with burn-up a question of just one or two more revolutions.

This shrinkage is what is called 'orbital decay,' but let us go on with theoretical reasoning for a little while longer. Let's have another look at Fig. 1, assuming that it now shows something different. It now shows *two* satellites in two different orbits, but both of them have the same perigee altitude. Which of these two satellites will have a faster orbital decay, the one in the larger or the one in the smaller of the two orbits?

The answer is not easy to give and for real satellites, which are apt to be different in size, shape and mass, two detailed calculations would be required. But we can assume that our two satellites are identical; spherical in shape, two feet in diameter and weighing 200 pounds.

Satellite L has its apogee at a distance from the surface of 21,000 miles; its velocity at apogee is an even one mile per second, and its orbital period from apogee to apogee also happens to be an even figure, namely 10 hours.

Satellite S has its apogee at a distance from the surface of 12,000 miles; its velocity at apogee is 1.4 miles per second, and its orbital period is 6½ hours. The main factor that reduces the lifetime in orbit of satellite S is its shorter orbital period. In 130 hours it goes 20 times through its perigee, while satellite L, during the same interval, only goes 13 times through its perigee.

But there is one factor that works in favor of satellite S. Satellite L, coming in from a more elongated orbit, goes through its perigee at a higher velocity than satellite S. Now it is a rule of thumb that air resistance increases roughly as the square of the velocity. If the velocity of satellite L were twice as high at perigee as that of sa-

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tellite S it would encounter four times as much air resistance and might well have a shorter lifetime in orbit than satellite S.

In our example that is not the case. The velocity of satellite S at perigee is 6.25 miles per second, that of satellite L is 6.5 miles per second. Satellite L does encounter more air resistance, but not so much in proportion as to overcome the fact that S goes through perigee nearly twice as often as L. Satellite L wins out. But if L had the same volume as S but only one tenth of its mass, S would win out.

Since residual air resistance is the villain in the struggle for survival put up by the two satellites, the goal of an indefinite lifetime (if that were in the goal, which it usually is not) could be accomplished very easily by lifting the perigee out of the atmosphere.

It so happens that the second American satellite put into orbit in 1958 went into such an orbit. It is Vanguard-I, launched March 17, 1958, with perigee at 409 miles, apogee at 2453 miles and an orbital period of 134.3 minutes. Now we can look at two actual orbits, those of Explorer-I and of Vanguard-I and see how things work out in reality. The raw material for the comparison to follow is a publication of NASA's Goddard Space Flight Center in Greenbelt, Maryland, the Satellite Situation Report, which is issued every two weeks. But since these reports are metric, we first have to convert the figures in miles, which have been used so far, into kilometers. Vanguard's initial orbit had it perigee at 409 miles which are 658 kilometers. The apogee of 2453 miles is 3947.7 kilometers. This was on March 17, 1958. Seven years and one month later the perigee was determined to be 652 kilometers and the apogee 3936 kilometers, a very faint decay. But as Table I shows, the orbit of Vanguard-I can be considered to be stable.

As can be seen there are minor fluctuations — the figures are sometimes smaller by about 3 kilometers (about equal to 2 miles). Even a satellite undisturbed by residual air resistance still has a number of factors influencing it. There is, to begin with, the factor many people think of first, the gravitational field of our moon. However, even before any satellite was put into orbit, the amount of lunar influence was carefully calculated. It is so small that, while there, it would escape detection by measurement. Another factor is the radiation pressure exerted by the sun. How influential this factor is depends on the overall density of the satellite. In the

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TABLE I. THE ORBIT OF VANGUARD-I.

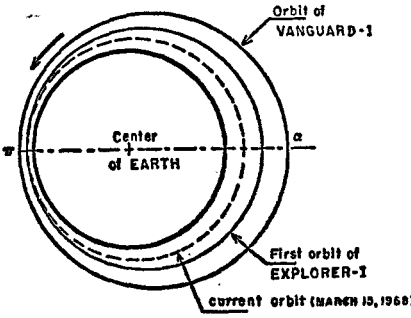
Date of Report	Orbital Period (minutes)	Perigee (km)	Apogee (km)
April 15, 1965	134.0	652	3936
July 15,	134.0	652	3937
Sept. 15,	134.0	649	3940
Dec. 15,	134.0	650	3939
March 15, 1966	134.0	650	3938
May 31,	134.0	652	3936
Aug. 31,	134.0	646	3941
Nov. 15,	134.0	650	3937
March 15, 1967	134.0	659	3934
June 15,	133.9	650	3934
Oct. 15,	134.0	649	3938
Jan. 31, 1968	133.9	654	3931
March 31,	133.9	651	3934

case of Echo, which was just a big plastic balloon, it was considerable. In the case of fairly dense and small satellites, it is minor; but it could be detected in the case of Vanguard-I. The main disturbing influence for satellites near the earth — and the apogee of Vanguard-I is only about one third of the earth's diameter from the earth's surface — is the earth's equatorial bulge. As a matter of fact, the perturbations of the orbit of Vanguard-I were used to calculate the mass of the equatorial bulge.

And then there are errors of measurement, but these errors usually 'smooth out' if a large number of revolutions are measured.

Fig. 2, which is carefully drawn to scale, shows the orbit of Vanguard-I which since 1957 has changed so little that the difference disappears in the thickness of the line in the diagram. But Explorer-I, as can be seen from the diagram, has very noticeably decayed.

Fig. 2. The original orbit of Explorer-I and its current orbit (broken circle); the orbit of Vanguard-I is drawn for comparison. This diagram is to scale.



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On February 1, 1958, its perigee was at a distance of 224 miles (360.5 km), its apogee at 1573 miles (2531 km) and its orbital period was 114.8 minutes. Seven years and ten weeks later the orbital period was only 104.2 minutes, the perigee had slipped to 213 miles (343 km) and the apogee had approached to a distance of 976 miles (1571 km). What has happened since is shown in Table II.

Table II shows the orbit month to month over a period of nearly three years. During this time the orbital period shrank from 104.2 minutes to 100.2 minutes, precisely 4 minutes. The perigee altitude slipped from 213 miles to 205 miles, or 8 miles. The apogee altitude has suffered, as predicted by theory, a much larger loss, from 976 miles to 751 miles, or 225 miles less.

The obvious next question is how long Explorer-I is still going to stay in orbit. Nobody can tell precisely, and the question is likely to be met by a profound silence, because the original estimate of the lifetime of Explorer-I, made a week or so after firing, was three years. It has been orbiting for ten years by now and the estimate of its remaining lifetime is again three years, but this time surrounded by careful explanations about the factors we don't know. As a matter of fact, we are waiting for Explorer-I to teach us some of these factors.

Because of very many unmanned satellites of relatively short lifetime and of manned flights, we know the density at an altitude of 100 miles. But Explorer-I is now at about 200 miles and the data for that altitude are going to be largely derived from its behavior. Then there is another unknown factor which does not matter much right now but will become important later on. Explorer-I is attached to the top stage of the rocket that put it into orbit. For this reason it has the shape of a very long artillery projectile, about 6 inches in diameter and around 6 feet in length. Naturally it does not have any stabilizing devices (if it had had any originally, they would be useless by now) and for that reason is likely to tumble. Its lifetime will be strongly influenced at a later time by whether it goes through its perigee nose first like a bullet or whether it happens to move broadside on.

So let us say: another three years.

Of the things still in orbit from the early years of the space age, Explorer-I is the only object left that has a foreseeable re-entry at all. In 1957 there were only two launches (Sputnik I and II), and both these satel-

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TABLE II. THE ORBIT OF EXPLORER-I.

Date of Report	Orbital Period (minutes)	Perigee (km)	Apogee (km)	Inclination of Orbit to Equator (degrees)
April 15, 1965	104.2	343	1571	33.20
May 15,	104.2	340	1571	33.19
June 15,	104.2	340	1567	33.19
July 15,	104.1	343	1558	33.18
Aug. 15,	104.1	329	1559	34.29
Sept. 15,	104.0	341	1553	33.18
Oct. 15,	104.0	337	1554	33.17
Nov. 15,	104.0	338	1555	33.18
Dec. 15,	103.9	340	1535	33.17
Jan. 15, 1966	103.9	341	1540	33.18
Feb. 15,	103.8	341	1534	33.19
March 15,	103.7	339	1528	33.18
April 15,	103.7	338	1521	33.18
May 15,	103.6	338	1515	33.18
June 15,	103.6	338	1512	33.18
July 15,	103.5	339	1507	33.18
Aug. 15,	103.5	340	1501	33.18
Sept. 15,	103.3	341	1487	33.19
Oct. 15,	103.2	340	1477	33.18
Nov. 15,	103.1	338	1467	33.18
Dec. 15,	103.0	338	1459	33.17
Jan. 15, 1967	102.9	338	1449	33.18
Feb. 15,	102.8	333	1448	33.18
March 15,	102.7	339	1427	33.21
April 15,	102.4	334	1402	33.14
May 15,	102.2	336	1379	33.17
June 15,	102.0	342	1355	33.16
July 15,	101.9	336	1354	33.09
Aug. 15,	101.8	336	1346	33.20
Sept. 15,	101.7	334	1336	33.19
Oct. 15,	101.5	335	1314	33.19
Nov. 15,	101.1	335	1292	33.10
Dec. 15,	100.8	334	1263	33.10
Jan. 15, 1968	100.6	335	1243	33.10
Feb. 15,	100.4	329	1226	33.10
March 15,	100.2	330	1209	33.10

lites and the top stages of their rockets have re-entered. Of the 1958 launches, four objects are in orbit: Explorer-I, Vanguard-I, the third stage of the Vanguard rocket and a metal object from the same shot. The two pieces of "space junk" produced by the Vanguard-I satellite have, of course, orbits quite similar to the orbit of the satellite, so they are going to stay in space, too.

Of the 1959 launches, five objects are still in orbit. They are Vanguard-II, the top stage of

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the rocket that put Vanguard-II into orbit, Vanguard-III, Explorer-VII and a metal object associated with the shot of Explorer-VII. The three objects of the Vanguard shots all have orbits resembling that of Vanguard-I, while the two objects from the Explorer-VII shot have an apogee of about 650 miles and a perigee at about 343 miles, a perigee high enough to make re-entry within the foreseeable future unlikely.

In time they may all be removed from orbit by manned spacecraft, but again in the foreseeable future, there is no need to do so, though it may be done as part of an exercise in spacecraft control and maneuvering.

— WILLY LEY

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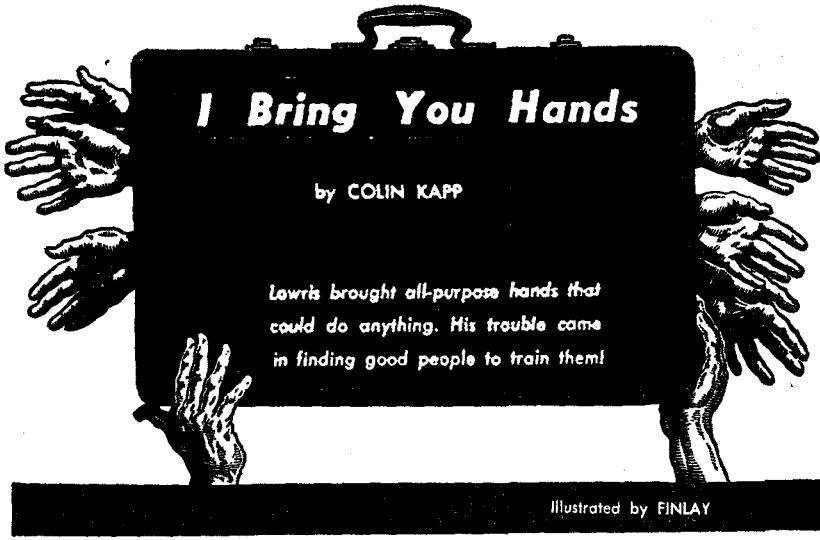
I Bring You Hands
by COLIN KAPP
Lowris brought all-purpose hands that could do anything. His trouble came in finding good people to train them!
Illustrated by FINLAY

I

Kandle took the card and scanned the legend irritably.

I BRING YOU HANDS

"I can't spare you long," said Kandle. "I'm a busy man." Then the message filtered through to conscious recognition. He read the card again, this time more slowly.

I BRING YOU HANDS

Scowling, he turned the card over and finally located the information he had been seeking:

TONY LOWRIS
(Managing Director)
LOWRIS LOW-COST
AUTOMATION SYSTEMS

Kandle breathed deeply and sank into his chair. "Very well, Lowris," he said, "explain to me about the hands."

From previous research Lowris felt he already had the measure of the man. Kandle was one of God's chosen few, who know themselves to be infallible. As a non-technical Works Manager,

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Kandle needed no reference to the opinions of technicians or accountants on matters about which he knew almost nothing. By the divine right of being the heaviest bully on the plant, plus having absolute discretion over hiring, firing and salaries, Kandle's infallibility went unquestioned. His despotism was exceeded only by his megalomania. Kandle's decisions were absolute and immutable — until he reversed them, as he frequently did, as if to assure the world and himself that one can be infallible without also being a bigot.

Lowris crossed his fingers behind his back and smiled inside himself. The situation was precisely as he had hoped. He had no wish at this stage to become involved with technicians and engineers. It was not that there was anything inferior or unsound about the commodity he was selling. Quite the contrary. He was quietly introducing a line which had all the explosive capability of a major manufacturing breakthrough. But it was not easy to sell hands to engineers who had made a lifetime's living out of proving that whatever a hand can do a machine can do better.

"Allow me to demonstrate," said Lowris.

He opened his large black case and hefted the device it contained onto the table. Then he whipped away the black shroud which covered the device to expose the apparatus to Kandle's startled gaze. The unit comprised a central column, about fourteen inches in height and a foot in diameter, of heavy, black, cast metal. The top of the column flared out to the proportions of a human shoulder and attached to and neatly folded in front of it was, incredibly, a full-sized reproduction of a pair of human arms, cast in a soft, pink, obscenely fleshlike plastic. The arms led to a lifelike reproduction of a pair of finely-proportioned hands.

Lowris delightedly watched Kandle stiffen as the shroud came away. It was a touch of drama which Lowris always enjoyed, but it was only the opener for his show. If Kandle could survive the initial shock he would doubtless carry into his bed that night quite unshakable impressions of the capability of the hands which Lowris brought.

"Hands . . ." Lowris was saying ". . . hands and arms — electromechanical reproductions of the flesh and lever mechanisms of the corresponding parts of the human body. The bones are vanadium steel; the joints are diamond roller enclosures, and the muscles are plastic-and-gel flexible solenoids with at least five times the strength of a human muscle . . ."

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He was hurrying past this part of the sales lecture, knowing that most of it was wasted on Kandle. Instead he concentrated on giving only sufficient information to enable Kandle to explain it vaguely to himself or others later.

"Control . . ." Lowris snapped open the back of the column, ". . . is by tape casette. Each casette has an available two-hour running time on the multi-channel playback head. Alternatively, tape loops can be used for short-sequence operations. The unit, of course, includes full facilities for generating its own tape programs."

Kandle said: "Of course," as if he had been listening in detail, but his eyes never wandered from the fleshy pinkness of the folded arms of the device which squatted on the far side of his desk.

"Now," said Lowris, "I suppose you'd like to see what it can do?"

Kandle said: "Yes!" and Lowris located the power socket on the wall and made a swift connection.

"You will appreciate that these are only demonstration programs. The actions the hands will perform are designed purely to demonstrate their strength and dexterity."

Lowris depressed a switch and the arms unfolded with a graceful movement and came to rest parallel with each other with palms open and turned upwards as if waiting to receive a gift. He took a pack of cards from his pocket and placed them in the left palm carefully. After a few moments the hand grasped them, then the right hand moved over and began to deal the cards to four imaginary players, with a swift precision.

Kandle's eyes never left the delicate fingers which moved across his desk. He watched them with a fixed concentration which was little short of hypnotic fascination. When the whole pack had been dealt, the hands still continued to move, dealing two imaginary cards before coming to rest.

"Object lesson," said Lowris. "The machine is comparable to a blind moron. It will perform superbly well the exact instruction which have been programed into it. Nothing else. This program was set with fifty-four cards. There were only fifty two in the pack I gave it. While there is a crude sensory feedback in the system sufficient to give it orientation, the fact that it was two cards short meant nothing to it. It tried to deal them just the same. Use smaller cards and the hands will drop them. Use larger, and they will fumble. But give them a precise job and the parts to fit, and they'll do the job untiringly and

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more faithfully than any human operator."

"What sort of jobs?" Kandle drew his eyes from the hands and looked at Lowris as if seeing him for the first time.

Lowris spread his hands. "For instance, loading a press-tool with piece-parts from a pre-positioned box, operating the press, then clearing the pressed parts to another box. All you have to do is keep the incoming work suitably positioned for the hands to find by touch. A perfect industrial situation — no overtime, no coffee breaks — and if you arrange an automatic feed system, then you can set them operating twenty-four hours a day. In fact, you can turn out the lights and go home."

"Could they operate a drilling machine?" Kandle was afraid of sounding enthusiastic.

"Certainly!" Lowris was gaining mastery of the situation and was enjoying it. "You can make those hands type, knot, assemble, pack eggs, bend wires, solder, feed machinery, or make love caresses. Anything a human hand can do, they can do — once you accept that they are sightless and mindless. They act in perfect obedience to their program, without wages, argument, shop-stewards, machine guards, dermatitis, union-shop conditions or time-off to go shopping."

"That would have to be proven," said Kandle, catching himself in the midst of a transitory show of exuberance.

"Watch!" Lowris placed a compartmented tray of electronic components on the table and extended his wiring to include a soldering iron. He inserted a new program casette into the column and touched the hands into action. They went to work assembling a fine and delicate piece of apparatus with all the skill and precision of hands with many years of experience at the art. In twelve minutes of rapid and extremely fine manipulation, the apparatus, a miniature transistorised radio receiver, was complete. The hands then offered it hesitantly to Kandle.

Somewhat surprised, he took it and switched it on. It worked without hesitation.

"And now watch," said Lowris. He took a bar of steel from his case and invited Kandle to bend it. The metal flexed slightly but suffered no permanent deformation. The hands took the bar lightly, played with it for a moment, then deftly tied a double knot in it with no more effort than if it had been a piece of rope. This too they offered to Kandle.

Kandle took the metal knot and sat, a slightly baffled expression on his face, trying to reconcile the conflicting concepts of delicate ac-

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curacy and superhuman strength, two extremes of muscular activity which were both well outside of his own limited capabilities.

"All right," he said at last. "How much?"

"Nothing for the first one." Lowris was still leading the situation. "And four thousand pounds each thereafter."

"I don't follow," said Kandle.

"An introductory offer," said Lowris. "You show us a suitable job on which you are employing several full-time operators. We install and program a pair of hands to do the job and guarantee one pair of hands on an eight-hour shift will perform as much work as two human operators during the same period — or the work of six, if you set it up for twenty-four hour operation. We do a work-and-cost study with your accountant and calculate the cost saving. When we have saved you four thousand pounds, you pay that sum to us. We take the old machine away and give you a new one."

"Let's get this straight," said Kandle. "You lend us a machine at no cost, and only when it's saved its own price do we purchase our own. Suppose we find we don't want a one then?"

Lowris shrugged. "Our risk. You're under no obligation to purchase a subsequent machine if you don't wish."

Kandle was suspicious. "That's a peculiar way to do business, Lowris. I can see the advantages to us, but not to you. What do you get out of it?"

"Experience shows us that the demand for a second pair of hands invariably comes before the end of the loan period on the first. So it's a measure of our confidence in what we have to sell. From a thousand-ton press to a love caress — whatever a hand can do, ours can do better."

"Put your offer in writing," said Kandle, "and I'll let you know."

Lowris replaced the hands in the box and maneuvered it to the door. Then he shook hands and left. Kandle sat back at his desk with a piece of knotted steel, a transistor radio, and a piece of card with a message no longer enigmatic:

I BRING YOU HANDS

II

Lowris was under no illusions about the difficulties of the assignment. It was for this reason that he preferred to make the initial installation himself. Despite his being an innocent in the realm of manufacturing techniques, Kandle knew well what the bottlenecks were in his production line and which were the jobs on which it was most difficult to re-

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tain labor. He had apparently acquired the useful industrial gift of persuading the shop stewards to do their duty wearing blinkers and heavily rose-tinted spectacles, for many of his processes presented health hazards to the operators which should never have persisted into the twentieth century.

Curiously, such is the luck of the "infallible" mentality, that Kandle got away with these industrial malpractices completely, although his labor turnover was staggeringly high. Lowris, who had researched the Company to a point where he could have recited verse and chapter on its operation, was not therefore unduly surprised at the nature of the job on which it was intended to try the hands.

Kandle had chosen the feed end of a hot-tinning process, where pieceparts were flux-coated by hand and then introduced into a bath of molten tin, from which they were recovered, mercifully by a decrepit chain-link belt which dropped the hot parts into a dangerously hot and reeking paraffin quench tank. Lowris reasonably estimated that the whole process could have been conventionally mechanized for less than the cost of a pair of hands. But his purpose was to sell hands, and Kandle was not a person to listen to gratuitous advice.

The whole atmosphere surrounding the tinning process was an offence to the human organism. The flux was a vicious halogenactivated liquor, notorious for its tendency to promote dermatitis. The evaporation of liberal amounts of this fluid in contact with the molten tin further liberated quantities of vaporized chlorides and probably fluorides into the air. The cover-flux layer on the tin bath was dirty and inefficient, and the fumes from the paraffin quench at times grew quite alarming. A disturbance of the span roof above showed where some enlightened predecessor of Kandle had once had a fume extractor installed; but the apparatus, probably corroded beyond repair, had long since been removed.

In the midst of this minor hell of heat and fume, four girls, some only in their late teens, chattered incessantly to each other as they worked. With typical infallible organization, Kandle had not thought to warn the girls of Lowris's coming. His arrival in a neat, dark suit and staggering with a large black box caused a delicious moment of confused amazement. When they had decided amongst themselves that Lowris was apparently going to work on the tinning section with them, they all retired to the toilets for a period and then resumed work in expectant semi-silence punctuated

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by outbursts of infectious giggling.

Lowris completed his first survey of the job and took measurements of the various critical parameters. The girls watched him covertly, as though he might be expected to indulge in some sudden act of outrage. It was never quite certain whether this was what they hoped or feared. Lowris continued his work, coloring slightly occasionally, unused to being the focus of such concentrated and mocking interest.

Finally one of the girls, unkempt, and with a ferocious scowl and overwhelming self-confidence, slipped over to where he stood.

"Here — what you supposed to be doing?" The tone was a mixture of inquiry and impudence.

Lowris played it lightly. "Hands," he said. "I'm a specialist in hands."

"Well, you can keep 'em off me for a start." She both laughed and scowled at the same time, revealing a remarkable complexity of character. "I mean, what you doing with your hands?"

"Wait and see," said Lowris.

She reported back to her workmates, baffled for a moment, but watching carefully as Lowris opened the box and set his device, still shrouded, upon the benchtop.

"Hey! He's erecting a statue," she decided suddenly. "A statue of us and old Jean that fell into the paraffin." Shortly she skipped back to Lowris's side and raised a corner of the shroud expectantly.

"What's under there?"

"Three brass monkeys," said Lowris wickedly. "We want to find out how cold it gets in here at nights."

She pulled an impudently wry face. "Hey — you're a bit cheeky, aren't you? Better'n the ones down in them offices though." She nodded her head in the general direction of Kandle's administration. "They don't speak to you at all if they can help. Just give you little tickets, like, telling you what to do next."

"And do you usually *do* what you're told?"

She put her head on one side, trying to repress a burst of deep-seated mischief. "Sometimes I do . . . and sometimes I don't. Depends on who's doing the telling."

She started to go away, then turned back with a sudden thought. "You can call me Nancy. Everyone calls me Nancy — even old Kandlegrease."

"That's nice," said Lowris, trying to make some critical measurements.

"What's your name then?"

"Lowris," said Lowris.

"Lowris what?"

"Lowris nothing. It's something Lowris, but nobody ever uses it

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that way. How come you've got so much time to chat?"

"Oh, they don't know what they're doing down there in the office. So we work a bit when we feel like it and chat when we don't. Nobody cares, anyway."

"That's rather what I thought," said Lowris, saving it in mind that with his own cost-accountant on the job, one pair of hands should show a four-thousand-pound cost saving over the present system in a remarkably short space of time.

At mid-day Lowris called in his own engineer and detailed the various stops, slides and registers he needed to facilitate the smooth feeding of the components to the location from which the hands would take them for processing. He dispensed with lunch himself, unshrouded the hands, and began to set them up in preparation for the difficult and delicate task of programing them to perform the required operations.

The whole key to the success of the hands lay in the programing, and Lowris was justifiably proud of his method, which enabled a complex sequence of commands to be established so precisely that a hand programed by a man to write his own signature would continue to produce copies of that signature in all respects indistinguishable from the original. Although the method of programing was basically simple, every gesture and nuance of touch imparted by the programmer to the hands remained as an operating characteristic identical with the movements of its originator.

In principle, signals from an unbalanced oscillator were fed to the flexible solenoid coils which comprised the muscles of the hands. By manipulating the hands through the program sequence and detecting the altering electrical responses of the flexing solenoids, a series of differences from the original signal were obtained and recorded on magnetic tape. A similar series of signals was also recorded for the sensory system, which imparted a degree of tactile expectancy to the hands and gave them a measure of orientation which corrected for undershoot and overshoot. The taped record was then used to produce the necessary signals to operate the hands.

Lowris was forced to agree that the scheme exceeded his own expectations, though he sometimes sweated to think of the years of frustrating experiment and modification which had preceded his present level of attainment. And all this to provide industrial illegitimates like Kandle with a cheap substitute for human labor which, in any case, he neither held in regard nor bothered to utilize

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at more than twenty percent efficiency.

In order to put the hands smoothly through the sequence of operations, Lowris had first to learn to perform the operations faultlessly himself. For some obscure reason, probably associated with paucity of the imagination, the activated flux was applied to the components by means of a household paintbrush. This involved precise rotation of the component and some complicated wristwork, in addition to holding the brush at the most advantageous angle. As a skilled technician, Lowris possessed all the necessary dexterity, but he needed time and repetition to transform the action into a smooth-flowing habit pattern. He was still practicing when Nancy and her mates returned from the dinner-break.

Nancy came and stood by him and watched him critically for a full five minutes.

"Man! Are you awkward!" she said at last. "Out of the way. I'll show you."

She maneuvered him off the chair by main force and began fluxing as though her life depended on it. Her short, capable fingers achieved a degree of accuracy and speed that Lowris had to admit to himself he would never be able to equal. She went through the stack of work at a pace that would have gladdened the heart of any rate-fixer, then threw down the brush in triumph.

"There!" she said. Then she looked up and for the first time noticed the unshrouded hands. "What the . . .?"

"Hands," said Lowris. "I specialize in them, remember?"

"What are they made of?"

"Plastic and steel and things."

"D'you know, for a minute I thought they were real. Somebody cut up. What you going to do with them?"

"Make them work, I hope."

She grinned roguishly. "Why don't you spread them out a bit, and then we can use them for holding yarn." She appealed to her mates. "Hey girls! They got a new idea — something to hold our yarn while we're knitting."

Opening the column, Lowris slipped in a tape casette containing a demonstration manipulatory exercise. Immediately, the arms unfolded, and the hands began to dance a pattern of finger and wrist co-ordination exercises, while the shoulder and elbow joints went through the sweep, extension and range movements.

It was a beautiful tape. The original tape program had been set by Madelain, Lowris's wife, an accomplished student of ballet and mime. The flow of the movements reflected with entire fidelity the precision, poise and dra-

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matic feeling which was so characteristically Madelain's.

Nancy was nonplussed but not enthralled by the performance. She recovered her equilibrium quickly. "Hey," she said. "He woke the silly things up!"

Lowris extracted the tape, inserted a new casette, and slipped rings on the plastic forefingers to couple them with his own as he guided them through the operations sequence to record the required program data. This was always the hardest part of the job. It was one thing to perform an intricate operation with one's own fingers, and quite another to perform it with a set of plastic fingers clipped under one's own, Practiced as he was in programing, Lowris was inevitably awkward in his first manipulations, and he spent an hour in dummy runs before he attempted a trial recording.

Nancy had watched all this with scowling interest and occasionally interjected: "Boy . . . are you awkward!" in a manner not calculated to improve Lowris's waning patience.

When, on trial playback, the hands succeeded in dropping both the component and the brush, she abandoned her own work and came over again.

"Here — I'll show you how to do it."

Lowris erased the trial tape without comment and considered returning later when the factory was closed in order to be able to set the program without interruption or comment. But he was developing a sneaking liking for this perky, sparrowlike Nancy, who would rush into a conversation or a situation where angels and Lowrises feared to tread. He appreciated the shattering contrast between her unabashed confidence and his own introvert caution.

Nancy worked her fingers into the coupling rings on the hands and wriggled them about deliciously, just to get the feel of things.

"Okay, you can switch on," she said. And then, with a sudden pause for thought: "Doesn't hurt, does it?"

"Only for a few minutes," said Lowris maliciously and quite incorrectly.

She searched his face to determine the truth of the statement "Doesn't hurt!" she decided.

To retain her interest Lowris switched on the recorder. "Now!"

She picked up the component and the brush, deftly completed the fluxing and dropped the component in the molten tin bath. Her fingers, guiding those of the hands, functioned as surely as if the hands had not been there.

"Again," said Lowris.

She repeated the operation, and

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then twice more, her control increasing steadily with each attempt.

"More," said Lowris.

At this point Kandle walked down the shop. He stood for a moment watching the operation, with one eyebrow quizzically raised. Then he walked on, apparently more interested in the sheaf of papers on his clipboard.

Nancy finished the box of components then looked at Lowris. "That suit you?"

"We'll soon see." He re-wound the tape, bade Nancy find some more components, then set the hands on program-controlled running. The hands performed the operation faultlessly, all of Nancy's quick movements and tenacity of grasp being reproduced in perfect detail. Lowris had to admit that had he worked all night he could scarcely have hoped to set such a program himself. He said as much, and she grinned and almost flushed with pleasure.

"Oh, any time!"

Their eyes met again — the triumphant yet sad impudence, and Lowris's vast and softer depths.

"Any time?" Lowris's ego reached out at some of her outflowing confidence and secured itself a shred. "What are you doing tonight?"

She caught up with his meaning, and her look of triumph almost dimmed out the other shadows underneath the scowl.

"Nothing. I was just wondering what I was going to do tonight."

The job completed except for the slides, stops, and registers which his engineer was constructing, Lowris borrowed Kandle's phone and called his office.

"Tell Jimmy I'd like the slides at Kandle's place by noon tomorrow if possible."

"So soon?" His secretary was surprised. "I don't think Jimmy's even started them yet. We thought this was a three-day job."

"It was, but I had some luck with the programing. It's all set here now, apart from editing the program and installing Jimmy's bits and pieces. Will you contact Harting and let him know I'll be coming there a day early? Oh, and Jean . . . Get my wife on the phone, will you, and tell her I'll be late tonight."

"Again? Really, Lowris, you are a swine! Madelain'll catch up with you one day. You can't get away with it for ever, you know."

"Once I would have cared," said Lowris, "but these days I just don't give a damn."

III

The next morning Lowris started trimming his program tape, selecting the best of Nancy's recorded performances, duplicat-

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ing the fastest and deleting the pauses and hesitations. The results, he decided, could best be handled by a closed-loop casette, and he phoned the office to include the necessary micro-switches to start and stop the process automatically.

The model-five hands were performing perfectly, and Nancy's own sure motions had imparted to them a certainty and sensitivity which was fascinating to watch. Then, by slight increases in the tape playback speed, Lowris gave them a rapidity which even Nancy would have been unable to match. This, added to the fact that the hands needed no coffee-breaks, lunch-breaks, trips to the toilet, or time off for a chat, made it easily possible to establish a work-rate verging on three times that of a human operator. Lowris felt he needed the extra speed, because he was perfectly sure that Kandle would understate the amount of work produced when it came to the calculations affecting the purchase of their own hands.

At twelve o'clock Jimmy arrived with a mass of prefabricated slide parts. These they assembled rapidly to form a sloping ramp which would gravity-feed Kandle's standard work bins against the stops in a suitable position for the hands to find the components. The arrangement permitted the pre-loading of enough components to last the hands for about four hours. A similar arrangement would easily have halved the time wasted by Kandle's girls in moving work-bins about, but that was not Lowris's problem.

Using an electronic load-cell to detect when the bin had been emptied, Lowris added an instruction to the program for the hands to push away the empty bin to allow the next one to move down into place. A simple trigger switch stopped the hands when the supply of boxes on the slide came to an end.

Nancy watched all this with critical interest and then slipped around.

"Look, do you work for him?" She pointed to Jimmy.

"No," said Lowris. "He works for me."

"Do you have many people — I mean, working for you, like?"

"About thirty-five."

"And you're the boss?" She seemed slightly incredulous.

"I'm the owner," said Lowris. "It comes to the same thing."

"We going out again tonight?"

"I'm afraid not. Tonight I'm off to another job."

"Then I don't suppose I'll see you again?"

"Doubtful," said Lowris. "Not unless Kandle buys another pair of hands."

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"Oh!" She went away pensively and attacked her work with a savage scowl.

Jimmy moved up to his shoulder. "It's none of my business, Lowris, but that one looks like a whole load of trouble to me."

"Boy!" Lowris slapped him on the arm. "I was born in trouble, married it, and it's never left me since. Now I'm so damned used to it that I miss it if it doesn't happen."

"Please yourself," said Jimmy, "but Madelain'll crucify you if she finds out about this one. Remember what happened last time."

"There was nothing in this, anyway," said Lowris.

"Perhaps not, but I don't like the look in the eyes of that young miss. Something tells me you've not heard the last of her."

"I'll bear it in mind," said Lowris, unconvinced.

Before he left, Lowris called Kandle out to see a demonstration. The hands, functioning with perfect co-ordination, worked their way through a box of components in about a third of the time taken by one of the girls. Kandle remained impenetrably silent during these proceedings, but it was obvious that he was thinking. When the hands smartly pushed the empty bin out of the way and started on the next, his eyes widened appreciably. Kandle was certainly making the mental calculation as to how much work could be completed during the night if the ramp was left fully loaded at the end of the working day.

Lowris mentally hugged a picture of Kandle creeping in at midnight to load boxes on the ramp to achieve twenty-four hour operation, for such is the pattern of infallible management that it seeks to counteract inefficiency of method by operating for the longest practical periods of time — the antithesis of productivity. Kandle was also noting the performance of the hands as compared with the performance of his operators. From the deep gleam in his eyes it was possible to predict that a few wage envelopes would shortly include dismissal notices. Lowris shrugged inwardly. It was not his problem.

Lowris's trip to see Harting represented a new phase in the development of the hands. Lowris had realized that in one important sphere of human activity an extra pair of hands was never unwelcome — in the domestic kitchen. Harting was a minor genius when it came to constructing specialized catering equipment, and the union of Lowris's hands with Harting's pre-purposed kitchen line promised to yield an automatic domes-

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tic chef of considerable potential.

Refusing to sacrifice versatility for cheapness, Harting and Lowris had achieved a near impossibility in cost reduction by using the simplest possible range of kitchen equipment in a set configuration, relying on the inherent dexterity of the hands to achieve their aim. Unfortunately, this threw the onus back completely on the skill of the programmer, and the success of the venture now rested with the human hands which taught the automatic ones their job.

From the start, everything went wrong. The chef-instructor, whom Harting had engaged for the more skilful parts of the programing, proved to be a complete idiot when it came to manipulating the hands. Lowris's manipulation was good, but his cookery proved inedible. Harting, seeing the way things were going, got himself drunk on cooking sherry and remained in that state for three consecutive days.

Lowris travelled back on the following Wednesday morning with indigestion, a hangover, and an expensive booking arrangement for a stand at the forthcoming Good-Eating Exhibition where he was due to show something which it did not look as if he would now be able to produce. He arrived in town at mid-day feeling in the depths of a depression. He ducked lunch and went home for a change of clothes and a wash before going to his office.

Madelain was waiting for him coldly. She had obviously been crying, but was now in a state of icy restraint.

"What the hell's going on, Lowris? There was a girl up here yesterday who kicked up a frightful row demanding to see you. She said that it was all your fault she had lost her job, and what were you going to do about it."

"The damn little fool!"

"So you do know her then?"

"I can guess who it was. Sounds like one of the girls who works at Kandle's place. I installed some hands there recently, and it looks as if Kandle's given his tinning staff the bum's rush."

"Is that all?"

"All what?"

"All you're going to say about her?"

"That's all I know about her."

"It still doesn't explain how she comes to call at your private address, asking for you simply as Lowris." Underneath Madelain's white composure was coiled a taut whip of anger.

"Do me a favor!" said Lowris. "I can't be held responsible for Kandle's mistakes."

"I wish I was sure it was Kandle's mistake. It sounds more like one of yours."

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"Shut up!" said Lowris. "I've had enough of you for one day. I scarcely know the girl, and the fact that Kandle chooses to sack labor instead of re-deploy is no concern of mine. Anything else you've made out of this is entirely in your own imagination."

"Do you take me for a fool, Lowris? Do you think I don't *know* you were out with that girl the night Jean phoned to say you were with a client? You're not only transparent, Lowris, you've got damn bad taste — and if you've got involved with a stupid little tart like that you're a bigger fool than I thought you were. *Are* you having an affair with her?"

"No," said Lowris, "but the idea's beginning to have its attractions if this is the sort of treatment I get when I'm not having one. What makes you such a perfect shrew, Madelain? Does it come naturally, or did you have to study for it?"

"Neither." Madelain struggled to contain a complete emotional explosion. "It's just the inevitable result of being married to a rotten pig like you."

Lowris retired from the conflict before the final blowup, and feeling dirty, dishevelled, and emotionally drained, he went to his office in an even blacker mood than before. Jean, his secretary, stopped him in the outer room.

"Oh, Lowris, there's a chick in your office."

"A what?"

"A bird — name of Nancy. She's been in and out all morning waiting for you and generally raising Cain. Finally I phoned Jimmy, and he said to put her in your office and give her a staff-employment application form."

"He said what?"

"He said he had an idea you wanted her for something, but he wouldn't say what."

"Bang goes Jimmy's Christmas bonus — for insubordination."

"Oh-oh! Like that is it?" Jean looked at him sharply. "Frankly, Lowris, she doesn't look your type."

"The way I feel right now, nobody's my type. I'm sick to death of the whole damn human race."

"Trouble with Harting too?"

"The trip was a calamity and a disaster. Going home afterwards was a grave mistake, and coming here and finding Nancy in my office is just the sort of touch I need to convince me I'm in an advanced state of persecution paranoia."

"What are you going to do about *her?*"

"About Nancy? Nothing. Get rid of her for me, Jean. I've got troubles enough for the moment.

Jean shook her head. "Sorry, Lowris! That's one bed you've made which you are going to have

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to lie your own way out of — if you'll excuse the metaphor. She looks a pretty determined little madam to me."

"All right! I'll get rid of her myself if that's all the co-operation I'm going to get. What the hell's the matter with the world today?"

He strode to his office and opened the door. Nancy was comfortably seated in his chair at the desk, reading magazines. She looked up, a trifle nonplussed.

"Hello!"

"I've got a bone to pick with you," said Lowris sternly.

She laughed and scowled simultaneously, in her own inimitable fashion.

"Yeah . . . and I've got *two* to pick with you. What are you going to do about my job?"

Lowris ignored the question. "Did you go round to my house last night?"

"Yeah. Well, I had to see you, didn't I? Old Kandle gave me the push because of your hands, and I went to your house because I knew you'd give me a job on account of our being friends and me being able to help you."

"But what did you say to my wife?"

Nancy grinned reflectively. "The old girl came to the door, and I told her what I wanted as sweet as pie. But she started getting cross and stuck-up and said she was your wife and if I wanted a job I'd better ask at the factory or office. Then she asked me why I came to the house, and I wouldn't tell her because it was none of her business. So she gets mad at this and says she thinks I'm having an affair with you. Then she calls me a stupid little tart, so I called her a frustrated old bag and said I didn't blame you for playing around if that was what you had to come home to."

"I see!" Lowris found the visitor's chair on the other side of the desk, sat down weakly, and put his head in his hands. Then the mental picture of Madelain's reaction at being called a "frustrated old bag" was something he was unable to contain, and he sat up laughing.

Nancy watched him warily from behind the desk. "I'm glad you think it's funny."

"I have to," said Lowris. "It's the only thing that stops me going mad on days like this."

"Well, that's all right, then. Hey, what about this job I come for?"

"What job?"

"The one they gave me this thingummy about." She waved the application form at him. Lowris took it, simply because it was offered, and scanned the offensive spider crawl, blots, misspell-

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ings and frequent alterations which constituted her entries.

"Suppose I can't find you a job?"

"You'll have to!" This was mock scolding. "After all, it was your hands that took my job, and I did show you how to make them do it. So I thought maybe you could use somebody to make your hands work right . . . seeing how awkward you are."

"Thanks for the thought," said Lowris weakly. Sitting on the wrong side of his own desk, he reflected that the interview was not going at all the way he had intended.

"I don't think . . ." he said dubiously.

And then a new idea fetched him to the point of decision. "Can you cook?"

"Maybe." Nancy screwed her face up in an amazing spectrum of expressions centered on a slight trace of disgust which was registered by her nose. "Why, you hungry?"

"No," said Lowris. "You've just given me an idea. There may be a job for you if you're willing to take a little trip."

"A trip? With you?"

"I'll be along too."

"And do I get paid as well?"

"A hundred dollars a week for a four-week trial period. After that we'll see what you're worth — if anything."

"And what do I have to do for the money?"

"Program hands."

"And?" She looked at him with a light of challenge in her eyes.

"That's all that's included in the job. What do you do in your spare time is your own affair."

She was baffled. "A hundred a week for next to nothing. Boy . . . you must be joking!"

"Take it or leave it," said Lowris.

"Look, mister, if you're crazy enough to give me that much a week for easy work, of course I'll take it."

"Good! Get packed tonight and be at the railway station at nine o'clock tomorrow morning."

He pressed the button and waited for his secretary to appear. "Jean, progress this application form, will you? I'll fill in the details later. And phone Harting and tell him to have his chef-instructor chappie ready. I'll be with them tomorrow with some new ideas. Oh yes, and you'd better fix train reservations and hotel accommodations for two. I'm taking Nancy with me."

Jean took the application form and scanned it without expression.

"One double room or two singles?" she asked finally, looking nowhere in particular.

"Use your initiative," said Lowris. "Don't bother me,"

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The telephone buzzed softly. Jean went to her own office to take the call. A few moments later she was back.

"Madelain. Wants to know when you're likely to be home."

Lowris glanced at the stacked papers in his tray and pursed his lips. "It'll take all night to clear this lot if I'm going away again tomorrow. Tell her I've gone to take Harting a bird. That's so near the truth she'll never damn-well believe it."

Nancy said: "Hey!" indignantly, at the same time exhibiting a flush of triumph. With a raised eyebrow, Jean went to deliver the message and then to book a hotel as her initiative and intuition both dictated. Lowris, feeling brighter than he had felt all day, ejected Nancy from his office and set about catching up on his paperwork. Amongst the top papers was a tentative inquiry from Kandle wanting to know on what terms Lowris would be prepared to supply a second pair of hands.

IV

Lowris's decision to employ Nancy was based on a piece of psychological insight with deeper roots than its potential for adultery. As an introvert, Lowris lived with the constant spectre of failure hovering about his head. It inhibited his manipulation of the hands as much as it reduced the size of his handwriting and robbed him of the power to speak effectively in public. Nancy's manipulation — in fact her whole outlook — was uncluttered by any such impediment. She had no fear of failure. To her it was unimportant.

The fact that her culinary prowess was initially limited to producing atrocious cups of coffee worried her not a bit. She followed the chef-instructor through the operation of making souffles nineteen times, almost collapsing with amusement as her pan produced an amazing sequence of unappetizing rejects. The twentieth time she reached a perfection worthy of Madame Poulard herself. Lowris acquired the tape record immediately, and the results produced by the hands on replay were identically good.

Then things began to go more smoothly, and the menu of the Lowris-Harting Robotic Kitchen not only grew to an attractive length but achieved a standard such as the domestic housewife could seldom be bothered to match. Lowris's confidence improved to such an extent that he doubled his publicity campaign and gave Nancy an increase in salary.

Not even the reproachful letters from Madelain worried him overmuch. He had anticipated her

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mood, and when he bothered to read her letters at all he accepted her bitterness philosophically and with an attitude of tolerant martyrdom. She had always been a good wife to him — according to her own possessive view of the situation. Lowris knew that it was his own almost pathological aversion to being possessed which had brought about the schism, and it was the exercise of this failing for which he was now being blamed. He had no intention of forming a permanent liaison with anyone — certainly not with Nancy. In the meantime, the present arrangement with her suited him rather well.

Most of the tapes required for the Robotic Kitchen were complete within the first month; and during the second month Nancy built up an impressive library of extra tapes which extended the scope of the robotic unit to well beyond what had originally been intended. With such a formidable armory to unleash at the Good Eating Exhibition, Lowris's success was assured. For once fortune was swinging him recklessly high — so high the ground seemed a long way off.

Then just as the pendulum began to swing again, some overwrought spring snapped, and the whole unstable weight which was his life went crashing into the depths.

The police message reached him at mid-day, and he caught the first train out, shattered by a frantic sense of loss, remorse, and guilt. Madelain had taken the Jaguar and driven onto the thruway. At an overpass just ten miles from the entrance she had hit a concrete column at a speed estimated at better than a hundred miles and hour. Everyone was kind. Nobody suggested she had left the road deliberately. She had been speeding — a wet road — a blackout, perhaps.

He shook off the well-intentioned circle of friends and sympathizers, feeling the black swamp of sick responsibility closing round his head. At times like this he knew he was better alone, left to try and face himself in some dimly-lighted bar where he was anonymous and where nobody even tried to probe the conflicts which tore him.

The point which emerged to worry him was Madelain's motive. He had no doubt in his own mind that she had deliberately crashed the car in an act of desperation. The uncharacteristic part of the affair was that it now left him free to spend his life as he wished. Knowing Madelain's talent for possessiveness, he could not convince himself that she had destroyed herself in order to leave him free. He could not get rid of the feeling that in some way she

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had contrived to make it impossible for him to continue his liaison with Nancy.

How this could have been arranged was something he grew progressively less able to understand as the evening went its alcoholic way. When he finally considered himself insulated against all feelings of grief or remorse, he performed the one act that everyone had advised him against — he went home.

It was raining. The taxi delivered him to the door and then speedily departed. He stood for a moment against the damp hedge, welcoming the cold sense of reality which he felt in the raindrops on his face. He got his key upside-down in the lock.

Wrestling with the recalcitrant lock, he finally gained admission to the hall and struck out for the light switch. Nothing happened, although he distinctly heard it click. He reflected curiously that Madelain must have turned off the electricity at the main switch before taking the car. The main switch was in the garage, and he was in no state to negotiate the garage doors, nor, since all he needed now was rest, was there any necessity to try. Sufficient light from the street-lamp opposite entered via the hall windows to permit him to find the bedroom. The bedroom light did not work either, but he knew from habit how to find the bed in the darkness. Pausing only to slip off his shoes without the trial of undoing the laces, he threw himself on the softness of the bed.

Then shock! Fingers closed around his throat, the pale, indistinct arms reaching for him from the headboard. Sober, he might have torn himself away, but in his condition of lowered responses he missed his chance, and the model-five hands encompassed his neck longingly. With sudden panicky insight into his predicament he tried to throw the base of the hands off balance, but whoever had secured it had done the job too well.

. . . The bones are vanadium steel . . . the muscles . . . plastic-and-gel flexible solenoids . . . with at least five times the strength of the average human muscle. They act in perfect obedience to their program . . . every gesture and nuance of touch . . . identical with the movements of its originator . . .

Technically it was a flawless tape. The flow of the movements reflected with entire fidelity the hours of rehearsal and the precision, poise and dramatic feeling which was so characteristically Madelain's. After an hour of subtle and expressive pressures the hands even suffered him to die.

— COLIN KAPP

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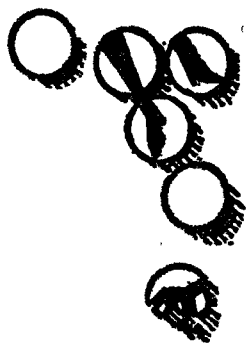
A VISIT TO CLEVELAND GENERAL

by SYDNEY VAN SCYOC



Illustrated by GAUGHAN

Each morning he took a pill to help his memory. But to help it in exactly what way?

His eyes carefully averted, Albin Johns swiped the depilatory off his jaws and splashed his face with water. He slapped his shirt shut. Then, forgetting, he glanced at the face in his mirror. It was a dark face, assertively intelligent, youthfully stern.

He blinked away, shuddering. His hand, lurching, cornered the jug of pink capsules, shoved one into his mouth. He gulped, as he did every morning.

He frowned at the jug's label. "One daily. For memory."

It annoyed him that he couldn't remember why he swallowed that daily capsule. It seemed a purely automatic action of hand and mouth, a muscular act beyond voluntary control. True, some mornings the reason loomed momentarily as near as that disturbing face in his mirror. But it always slipped away.

Usually right after he swallowed the memory capsule.

The timespot chimed the hour. Johns's saucer thumped softly at the parlor window, announcing its arrival from the parking tower. Briskly, Johns strapped the speech recorder to his wrist, checking to be absolutely certain he had inserted a fresh capsule the night before.

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It was a lucky break, just three months out of news school, to be sent to Cleveland General Hospital in Tac Turber's stead. Turber had done the local medical column for seventeen years, until his recent illness. No one at the *News Tribune* knew how long Turber might remain in Florida on recuperation leave — perhaps weeks; perhaps months. If Johns handled Turber's hospital feature well, he might be given other of Turber's regular assignments, until Turber returned.

Johns smoothed his hair nervously, resisting the impulse to check himself in the mirror. The saucer thumped again. Johns approached the parlor, drew a deep breath, and hoped.

In vain. "Albin, I was afraid you had overslept," his mother trilled from Washington state. She glowed upon his westerly wall, coffee cup in hand. "I was about to cast myself into the bedroom to check."

Limited though she was to a single plane, his mother nevertheless tripped the circuit that turned him defensive. "I had to order a clean shirt," he mumbled, glancing hopelessly at the window, so near, so far.

Her image sharpened. "*Why* didn't you order one last night? Before you slept?" Her face was much like the one he had confronted in his mirror, dark, assertively intelligent, promising myriad opinions agressively articulated.

"I — I took care of everything else then. I refilled my recorder and ordered fresh shoes. Everything else." He edged toward the window and the waiting saucer.

She eyed him acutely. "I simply don't comprehend, Albin. Before the accident, you would *never* have forgotten to order a fresh shirt. That's the sort of thing I could have expected of poor Deon. But you were always *meticulous,* Albin. I used to say, '*Albin is my son — Deon is his* father's.' "

"I take a memory capsule every morning, Mother." Johns had reached the window. He tapped the pane. It slid. The saucer extended its entry hatch into the parlor.

"You take a memory capsule every morning, yet you're about to step out the window without even swallowing breakfast," she said bitingly. "You're more like Deon every day, Albin. Giving up your law studies for news school. Forgetting to order fresh shirts, going out without breakfast and then bolting a burger at some drop-in. Sometimes I think you're trying to *be* your brother." She leaned into the camera menacingly. "*Are* you trying to make it up to Deon for dying in that hideous

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crash? By taking up all his habits, his interests?" Her eyes narrowed. "Well, *are you?*"

"I — no, of course not." Johns backed across the room to the serving counter. Breakfast waited, seven green pills, two violet capsules, a wafer. Unfortunately his hand shook. Pills spilled across the carpet.

"No, *no!* Don't crawl around in your fresh clothes. Dial fresh pills, Albin," his mother shrieked from the state of Washington.

Abashed, Johns jumped up and dialed.

"I'm doing everything a mother can," his mother moaned. "I supervise your breakfast every morning. I see that at least you go out the window with nourishment in your stomach." Her features enlarged ominously. "Albin, do you want me to come there? Do you need your mother?"

Johns choked. "N-n-*no!*"

His mother's eyebrows crashed into her hairline. Her coffee cup clattered. "Well! Take a tranquilizer, Albin. We'll speak again this evening." With an angry flash, she ended transmission.

Albin Johns breathed again. He jabbed a tranquilizer from the serving counter and gulped. After a moment, he punched aspirin as well. For some reason, he had a headache.

Fortified, he stepped to the window.

"Albin, take care," his mother pleaded unexpectedly from the wall. "You know how I fret."

Sighing, he faced her. "Yes, Mother."

"You're all I have, Albin. Promise."

Meekly he promised. Then he scrambled into the waiting saucer.

He hung beside the building, composing himself. His mother harbored the notion that he had been injured in the saucer crash that had killed his elder brother, Deon, a year ago. It was useless explaining, repeatedly, that if he had been involved, he would have memory of the accident, however fragmentary.

Unfortunately, he couldn't remember his brother Deon either.

That, he admitted, disturbed him. He was virtually certain Deon had not been a figment of his mother's imagination. His father spoke of Deon too, insistently. They had even taken down the family album, on Albin's last visit home.

Albin had refused to examine his dead brother's photo. Now he made excuses not to visit Washington. Better to deal with his mother two-dimensionally.

Composed, he took the controls. The saucer scudded over the city. Morning smacked blue against the dome.

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Today he began his career in earnest, after years of anticipation. He had edited his high school paper for three years. Made top of the class at news school. He'd played newsman from the time he'd learned to write.

He smiled, remembering. As a boy, he'd taken grim pleasure in writing up his mother's monologues, word for word. "... *and* you forgot to clean your nails again." ". . . just like your father. You walked right out without leaving a message with the computer. I fretted for hours." "Your brother, Albin, would never —"

He halted the sound track. Backed it. Replayed. ". . . just like your father . . ." "Your brother, Albin . . ."

The saucer wavered, bucked under his suddenly spastic grip. A tight band crushed his chest. Sweat popped from his forehead.

Breathing deeply, he eased his grip on the saucer's controls. Systematically, he loosened the panic-knotted muscles of his body.

He had suffered occasional moments of panic for months. Since the time he had supposedly been injured in the accident. With his brother.

Deon.

He gritted his teeth, ran the sequence through again. Accident. Brother: Deon.

He relaxed, smiling, almost proud. His mother was right. His brother's — Deon's — death had been a disorganizing shock. Only time and patience could effect recovery.

He peered over the saucer rim. Cleveland General Hospital jumbled glassy black below. Johns lowered the saucer to control altitude. The autoguide beamed by the hospital's parking system locked the manual controls. The saucer sank and swooped into the parking tower.

The saucer split. Johns glanced around the tower, feeling a return of tension. The saucer snapped shut behind him. Johns set his feet to the guide arrows that glowed across the pavement.

The arrows led him to a disk shaft. The disk hovered. Johns boarded. It settled swiftly. Johns stepped onto a second arrowed pavement.

The walls converged. Johns faced a dark, misty corridor. He hesitated, frowning back at the guide arrows. They unmistakably indicated the foggy darkness as his route into the hospital.

A streamer of pastel fog wafted from the tunnel, touched Johns's nostrils. His tensed muscles relaxed. He stepped into the soft, damp darkness.

The floor shuddered, carrying him forward. The walls glowed darkly, richly. The ceiling undu-

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lated. A low growling rumble throbbed through the tunnel, the grumble of distant machinery, monstrous but benign. Rainbowed fog sank lightly and refreshingly into Johns's lungs.

When the tunnel floor deposited Johns in the lobby, he was pleasantly relaxed, light of limb. A crisp elderly guard manned the computer console. Johns fumbled for press card and visitor's permit.

The guard fed both to the console. "*News Tribune*, heh? Your first visit to Cleveland General?"

Johns nodded, glancing uneasily around the vaulted lobby. It was disturbingly familiar, as if he had seen it before, from a different angle, with the sun slanting low through the rainbow panes.

The guard chuckled. "Well, you've seen our little establishment often enough on vidi. Makes you feel almost like you've been here in person."

Johns frowned. He didn't recall ever catching a vidi on Cleveland General. But there were, after all, any number of things he didn't remember. Despite his daily capsule.

The guard launched him with a friendly thump. "The blue walkstrip will deliver you right to Dr. Jacobs's office. Write us up good!"

The blue strip slid across the lobby and trundled into another dark, mumbling tunnel. Johns inhaled hopefully. His entire body relaxed. His head dropped. His knees sagged. Consciousness faded.

Then he stood blinking in a sunlit office. The receptionist, smiling, said, "Dr. Jacobs will see you immediately."

Dr. Jacobs was an erect old whippet with piercing pale eyes. He gripped Johns's hand coldly, fixed Johns with a blue-white gaze. "We're sorry to hear of Mr. Turber's illness. I don't suppose you know the exact nature of that illness, Mr. Johns."

"No one seems to know exactly," Johns admitted.

Dr. Jacobs nodded tersely. "And I don't suppose you have ever been with us as a patient, Mr. Johns?"

Johns was oddly disturbed by the question. "I — I'm — certain I haven't."

Dr. Jacobs sighed, scowling. "Well, I suppose you've done your homework, at least. Reviewed Turber's columns of the past year."

Johns nodded. The columns were freshly in mind, rich with detail, crammed with statistic, but eminently readable.

"Then you know that through computer diagnostics and the automated nursing system, we've

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overcome the human factor that flawed medical care for centuries. We've achieved perfection in physical care.

"But over the years we've learned the importance of nonmedical factors. Even the best in purely physical care is not enough for the anxious patient, the depressed patient, the patient harried by financial or personal worries. And so all major modern hospitals maintain teams of trained social workers to lend moral and practical support to the patient. This facilitates an optimum rate of recovery. The patient returns to the community fit to function as a fully adjusted, contributing member of society."

Dr. Jacobs's pale eyes glittered fanatically. "Our senior social worker has consented to let you accompany her on her rounds today. Miss Kling remembers vividly the day when doctors maintained private practices, saw dozens of outpatients daily and made all their diagnoses without computer aid." Dr. Jacobs speared Johns with a stern gaze. "You will be free to observe Miss Kling's working method, to draw upon her reminiscences of days past and to form your own conclusions about medical progress during the past quarter century."

"I'm very grateful," Johns faltered.

Jacobs scowled, jabbed a desktop button. The far wall of the office slid. "Please step into the decontamination lock. Leave your garments and personal possessions on the shelf. Press the white button to release the fog. Then pull on the sterile coverall. Miss Kling will meet you in the outside corridor."

Johns hesitated. "I'd like to keep my recorder, sir."

"Mr. Johns, we cannot allow personal effects in the wards. There is constant danger of contamination." Jacobs glittered down his long, bleak nose. "Mr. Turber was well able to compose his reports from memory."

Reddening, Johns stumbled into the lock. The wall slid. Johns unstrapped his recorder with reluctant fingers, remembering the facility with which Turber had used names and dates, medical terms, statistics.

Sighing, he stepped out of his clothing.

Absent-mindedly, he glanced down at his torso. His fingertips trembled unbelievingly over the sharp red scars that split his abdomen. He stared, uncomprehending. He shut his eyes, opened them again.

The scars remained.

Johns's hand jerked upward, as if reaching reflexively for the jug of pink capsules on his bathroom shelf.

Instead he encountered a white

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pushbutton. He jabbed it, desperately. A rainbow cloud puffed into the chamber. He inhaled heavily.

Gratefully, he felt the familiar relief of tension. He gulped the cloud. He sagged, unconscious.

Coolly the world returned. The ceiling glowed violetly, pinkly, greenly.

Gravelly laughter jarred into Johns's pastel coma. "You sucked that happy cloud so hard I had to wrestle you into your coverall myself."

Flushing, Johns sat up. "Miss Kling?"

She was anybody's tough old granny, a beefy, red-faced woman with hair of steel, a strong right arm and a ribald twinkle in her eye. "That's me. I must say you've healed up handsome, young Johns."

He stared at her blankly.

"Don't remember me? That's how it goes — forget us the minute you leave us." She laughed raucously. "Well, let's go. I've got a workload that would kill an ox."

Disoriented, he followed her down a long, glowing corridor set at intervals with numbered steel doors.

"We'll do Ward 17 first." She keyed open a steel door.

Johns's legs carried him through the door, then turned to stone. His jaw frozen, painfully. Sweat beaded over his suddenly marbleized face.

The ward was an expanse of black glass floor set with a maze of free-standing cubicles. Each cubicle was fully glassed, brilliantly lit, permitting full view of its interior. Music streamed through the ward, but beneath lay the rumble and grumble of unseen machinery. Small, gleaming robots twinkled over the glassy floor.

Johns groaned, unable to move.

Miss Kling boomed with laughter. She flourished an aerosol can that had been holstered at her belt. A minty cloud mantled them. "Gulp hard, but don't pass out again."

Blessedly, Johns's body became flesh again. The rock in his chest dissolved. He blinked away the last brittle web of panic.

"Just a touch of trauma. Happens to a lot of our patients when they come back. You start developing a tolerance for your amnesiac after a few months. We'll have to get your dosage adjusted."

Johns smiled condescendingly. He had never, of course, been hospitalized in his life. And the capsules he took were to improve his memory, not impede it. But he felt too blissfully at peace to argue.

"First stop: Maternity. Don't

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worry — everybody's decent." Chortling ribaldly, she piloted him across the glassy floor.

Johns surveyed the cubic maze loftily. Obviously a superior system. Each specimen housed in its own sterile environment.

Mothers napped, plucked eyebrows, stared at vidi. Strips of sensor tape, at wrists and temples, transmitted patient data to the central monitor system. Mounted on each cubicle was a manual control panel.

Miss Kling halted before a glowing cubicle, cocked her head shrewdly at the unmaternal little figure within. "Good morning, Edna," she boomed.

The girl splashed against the glass, an overripe little plum with flaming hair and feral black eyes. "You! Where's my kid? Three days you've told me you'd get him up here next day for sure. Ten days, and I haven't seen him yet. First that campaign to get me to sign adoption papers. Ha! Then you're keeping him till I'm strong enough to hold him — you say. Now for three days this yack about him being deformed."

Miss Kling chuckled blandly. "Now you know we've been waiting to see if he could survive, Edna. We wanted to spare you seeing the little thing if he couldn't live."

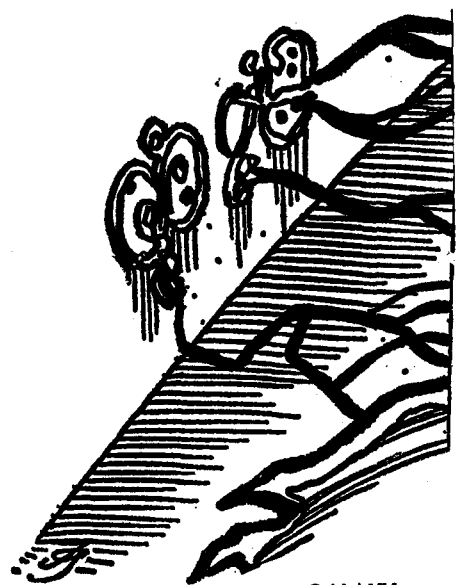
"Look, granny, I told you — I wasn't so dopey I didn't see the kid down in delivery. I got a good look. Nine pounds plus and everything where it belongs. Lungs like a pair of bellows. A natural born fullback. The doctor said so himself. I —"

Miss Kling rasped prevailingly, "Now, Edna, be calm. I'll have Dr. Dover explain the cause of death to you in person. I want you to consider it God's mercy —"

"Death!" the girl shrilled.

"— the little fellow didn't live to suffer. A single girl couldn't hope to care for such a terribly handicapped child all by herself. The expenses alone . . . ."

Miss Kling's stubby fingers crawled over the control panel.



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Rainbow fog seeped into the cubicle.

The girl's face discolored with rage. "I sure don't need any *man* to pay my way! I'm nineteen years old! I make good dollars dancing the nudie circuit. I come and go as I please. It's nothing to me Gordy ran out with that freak Gandi before I got him down to Marriage Hall."

Miss Kling smiled. "Dear, I wouldn't presume to judge your morals. I'm just Kling, your old granny in your time of trouble."

The girl's tirade ended abruptly. She blinked stupidly and sank to her knees in the swirling rainbow fog. "What did you say? About my baby?"

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"Now, you saw the poor little fellow yourself, Edna. Poor guy."

Edna sobbed thickly. "Poor little kid. And it's all Gordy's fault! He's the one made our baby deformed. He's the one ran off —"

"Now, Edna, one of our pretty little nurse machines will come," Miss Kling cooed. "You're going to have an injection. It's just a little something we give all our unwed mothers. It won't hurt at all, and you won't have to worry about babies for years and years."

"Won't have to worry?" Edna murmured.

"No more about babies. Not for five years. Why, by then you might be married. You might even *want* another baby in five years."

Edna smiled softly, curled up on the floor. Her hair piled scarlet over her face.

Johns stared at her, peacefully asleep on the glassy floor, awash in pastel fog. Then he noticed Miss Kling had trundled away. He hurried after her. "I've never heard of that particular law, Miss Kling."

"What law?"

"That you sterilize unmarried mothers for five years."

"Who said there was a law?" She pulled an aerosol from her belt. "Air's getting stale." She clouded the air generously.

Johns frowned. "I wouldn't expect any individual to have power to make that kind of decision for another individual. I mean —" He stopped, blinking through the pale cloud in confusion.

Her voice poured over him, suggestively. "My girls are here to recuperate, young Johns. I don't want them worrying over laws, or making big decisions all by themselves. If a girl has learned her lesson, why, I forget all about having her injected. But if I see she's going to land herself here again, get herself taken advantage of and then run out on, I give her the best protection we've got. That's what I'm here for, young Johns — to see my patients get what they need. Without having to fret themselves."

The cloud had slipped into Johns's lungs sweetly. Johns smiled. Then he had to wipe a tear from his eye. "That's — that's —" He couldn't express his feelings. To think that in this vast, impersonal institution, doughty Miss Kling pitched right in and fought for her patients!

"Glad you understand." Miss Kling holstered the aerosol. She halted before a cubicle containing a slight, pale girl in her twenties. "Good morning, Trenda. I'm Mabel Kling, your social caller. How do you feel?"

The girl looked up listlessly. "I'm all right, thank you." She touched a tear off her cheek.

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Miss Kling beamed. "The nurse will bring your brand new son in just a moment. Don't you want to pretty up a little, for your first visit?"

"My — son?" the girl said gropingly.

Miss Kling's fingers crawled over the control panel. The cubicle began to fog. Miss Kling chuckled reassuringly. "He's a real football player. Scaled nearly ten pounds this morning — you'd swear he was a couple of weeks old already. Lungs like a pair of bellows. And he has a mop of red hair. Just like your husband."

The girl sat up, confused. "But the baby wasn't even due for another three months. They gave me shots, but the pains wouldn't stop and —"

Miss Kling chuckled. "Happens all the time. We get girls having babies months and months early. Sometimes Old Momma Nature's adding machine doesn't use the same math the rest of us do."

The girl struggled to believe. "You mean the baby's really all right? He wasn't born too early?"

"You can see for yourself in a couple of minutes. You feel up to hefting a ten-pounder?"

"Oh, *yes!*" The cubicle was densely fogged. The girl's face flushed with excitement. "Why I — I even thought I heard someone say it was a girl!"

They left her excitedly dabbing her lips with color, lost in lavender fog.

Johns sobbed brokenly, overwhelmed.

"Now there's a case to make my job worthwhile," Miss Kling rumbled. "That sweet little girl lying there heartbroken, and I fixed everything up smart. By the time she gets the baby home, she won't even remember her sad hours."

Miss Kling launched herself upon another patient, but Johns was too choked with emotion to care.

Then Miss Kling checked her list and nodded with satisfaction. "That's maternity. Time for a quick tour of surgery." She chuckled. "Tac Turber was a real surgery fan — had to run him through butcher alley every time he came out."

Johns felt his mouth dry ominously.

"Coming?" she clucked.

He followed her to and through the glowing corridor, each step shakier than the last. Finally he blurted, "I read someplace that they — used to take organs from one person and — transplant them in another. Kidneys and hearts and spleens. I even read they transplanted brains — sometimes."

Miss Kling keyed the door into

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surgery. She eyed him narrowly. "Where did you read all that?"

"I d-don't remember. Not in Tac Turber's columns." Hopefully he ventured, "I guess they don't do much of that any more?"

Miss Kling chuckled. "Now, just think. If you had one man's heart, another man's liver, and maybe a lobe of somebody else's brain, you'd feel mighty confused, wouldn't you?"

"I — *yes!*" The word came with unexpected force.

"You can't go out and pull your weight if you aren't even sure who you are. Can you?"

"I — no. No."

"Now, do you think our fine doctors are going to devote themselves to turning out patchwork people? Sending people out into the world without an identity to call their own? Do you think old Granny Kling would let any patient of hers go wandering around without a name?"

"N-no. Of course not." He frowned, trying to follow her argument.

"Well, then?" Deftly she steered him into surgery.

The floor stretched vast and white. The surgical cubicles were spacious, brilliantly lit, jammed with complex machinery. White clad figures huddled. Nurse machines scuttered. Auto-stretchers bore unconscious passengers silently.

"In the old days, the average doctor spent so much time on routine, he hardly had time for a good day's surgery. Now the mech-clinics take care of the coughs and sniffles; the nurse machines bandage the cuts and the doctors can get down to business."

"I see," Johns said, dimly, swaying. Blood crashed in his ears. His hands twitched. Unable to resist, he tilted his head to stare at the ceiling. The patterned white on white held dreadful, compelling familiarity.

"I've never been here before," he croaked. He couldn't bring his head down. "I've never been in this hospital before. I've never seen this ceiling before. I've —"

Miss Kling jammed an inhaler into his nose. He struggled, then inhaled. After a moment, his head fell. He felt suddenly sluggish, torpid. "I've never been here before," he muttered.

"Of course you haven't," Miss Kling said sharply. "You don't have any scars. Do you?"

He frowned, trying to remember. "I —"

"Well, if you don't have scars, you haven't been in surgery. Have you?"

"I — no, of course not," he said with relief. Then he said, querulously, "My head hurts."

She touched the back of his head. "Here? Where they put the stainless plate in?"

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He nodded. His head pounded with agony.

"Keep the inhaler in place. I'll get Little Bayer."

She returned with a spidery little machine. It gripped his arm, injected him briskly and spidered away.

The pain eased. Miss Kling removed the inhaler and puffed him thoroughly with aerosol. He inhaled, smiled foolishly, gratefully.

Miss Kling beamed upon him. "Well now, I bet you're tired with all that walking. How did you enjoy your tour of surgery?"

"Very interesting," Johns mumbled foolishly. It seemed somewhat dim. In fact, he didn't really remember touring surgery at all.

"Ummm hmmm," she said shrewdly. "Then we'll scoot on down the hall to the party."

He followed her into the long, glowing corridor, smiling agreeably. The party. He always enjoyed parties.

Too bad he couldn't remember about this one.

He was a little surprised when she keyed the door marked "Terminal Ward."

"All our terminal patients have a little party before they go. But it's seldom they have dear ones to spend their last minutes with. Tac Turber's going to be mighty pleased."

Johns felt mildly surprised. "But Mr. Turber hardly knows me."

She chortled. "You'll be carrying on his hospital column, won't you? That makes you almost a son."

He drifted through the ward in her wake. Patients beamed rosily from their glassed cases. Miss Kling waved and yoo-hooed.

Finally Johns said, disbelievingly, "These people aren't all going to die, are they?"

"That's what they're here for," she said cheerfully.

He frowned around him, at the healthy, smiling faces.

"I nursed my own mother through her last illness," Miss Kling rasped. "Seventeen months I stood by, night and day. Couldn't afford a nursing machine, and I wouldn't send her to a home."

He murmured sympathetically.

"Knew as soon as the diagnosis was made she'd never recover. But in those days there wasn't anything to do but stand by and watch her waste off.

"I always remember that when my rounds bring me here. I'm proud my patients don't have to suffer through that. They go out quick and clean, with steak and whiskey on the house. And they know if there's any little piece that can be salvaged, why, our boys in butcher alley will find it.

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The spirit may die, young Johns — but the tissue lives on!"

They rounded a corner and confronted Tac Turber, glassed. Miss Kling rapped the glass, slid the entry panel.

Tac Turber bounced from the bed, a big man, burly in his hospital gown. "Well, well! Hear you got a promotion, Johns!" He pumped Johns's hand heartily.

Johns stammered, "Editor Downs is letting me handle your column until — until you get back."

Turber grinned. "Then it's yours for life, kid." He whacked Johns on the back. His eyes twinkled. "I guess everyone's heard I won't be back?"

"We heard you were going to Florida to recuperate from — whatever it is."

"Ah, the stories that make the rounds," Turber laughed. He sobered. "No, Johns, I'm journeying on to another life. A different life, but one certainly as useful as the one I've already led. My only regret is that I won't be able to do one last column. I've always wanted to write up the work they do down there in surgery." He frowned. "But somehow it always slips my mind, once I'm back outside."

Miss Kling said, "You can't crowd everything in."

Turber shook his head impatiently. "No, that's not it." He turned back to Johns. "There's so much excitement, Johns, so much to see. Sometimes when I get back to the saucer, I can hardly remember writing the report I'm holding in my hand." He frowned thoughtfully. "I guess I stop to use one of the machines in the director's office. But afterward . . . ." He shook his head, bemused.

Miss Kling stepped out to the control panel. Stepping back, she closed the entry panel. Rainbow fog drifted lazily up from the floor.

Turber sniffed. His frown faded. He grinned. "Well, it's been a good beat, Johns. You don't remember the old days, the old hospitals, the fear and uncertainty the human animal had to endure. And only the poor or the disturbed had someone like Miss Kling to help them out. Everyone else had to muddle through as well as he could."

The entry glass slid. A robotable wheeled in, bearing a feast.

Turber's eyes lit. "Looks like they catered for you too, Johns." He splashed Scotch into both glasses, then frowned. "They forgot you, Miss Kling."

Miss Kling scowled over the table. Her face sagged. "They never think to send a whiskey glass for me. I go to every party on the ward, but there's never a glass for me."

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Turber lifted a panel and punched the table's controls. Utensils, napkins and whiskey glasses clattered out. Beaming, Turber poured into a dozen glasses. He lifted two. "A toast to immortality!"

"A toast to your immortal liver and lights! Haw!" Miss Kling roared, swaying. "You know something, boys? I was supposed to plug in fresh nose filters half an hour ago. And I forgot. Haw! I forgot my fresh filters — now I'm going to forget everything!"

Johns laughed to be polite. Then he laughed some more. Soon he was bellowing and snorting in the swirling pale fog, gulping the whiskey as fast as Turber poured.

Then the bottle was empty. The steaks lay congealed, untouched. There was a squeak of wheels, and an auto-stretcher rolled into the cubicle.

"My car!" Turber hopped aboard. He threw himself upon his back, roaring with delight. "Home, James!"

The stretcher molded itself around him. A mask fell heavily over his face. Turber flailed, then lay limp. The stretcher squeaked away.

Miss Kling regarded the congealed feast regretfully. "Young Johns, I think I've forgotten something. But I can't remember what."

Johns said solemnly, "They're going to cut old Tac up and use his parts, aren't they?"

"Haw! I'll never tell!" Miss Kling frowned, regarding him with bleary thoughtfulness. "But I do remember a boy. No, two boys. Brothers. A smart-looking dark kid. Just like you, in fact. And a big handsome redhead, a year or two older. Crashed their saucer down the skylane a piece. The dark one got the back of his skull smashed, and the redhead got it in the belly." She scratched her chin thoughtfully. "But I guess that's about all I remember."

Johns nodded owlishly. "I don't even remember that much. I forget it every morning at eight."

She nodded. Then light came to her eyes. "Haw!" She drew a small green can from her belt. "My remembering spray. I remember that much. If I whiff the wrong color air, I just spray myself green and everything comes back." She sprayed.

Johns sniffed. It was very fresh, very clean, the green. He inhaled deeply.

"There! Clears all the synapses. Or something like that." Miss Kling's facial contours firmed with returning character.

It was as if the green spray had penetrated forgotten chambers of his mind, clearing them of ob-

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struction. "I remember now," he said, softly. "I remember —"

He was low over the countryside at the controls of his old saucer. A spring day. His brother perched nervously on the passenger's seat.

His brother — Albin. His dark, meticulous younger brother who had stopped in Ohio on his way east to law school.

He — Deon — grinned reassuringly. The saucer had developed a recurring shimmy a bit to the north. He was taking it low and slow back to the city.

The shimmy hit again. He handled the controls coolly. He was still working when the sudden, terrible shudder came. The gauges flashed peril. Alarms squalled. The controls jerked from his hands.

They were falling. He wrestled the controls, uselessly. He heard his brother's voice. "Deon, can't you —"

Impact. A few minutes of painful half-consciousness. He opened his eyes, saw his brother — Albin — sprawled nearby, a metal splinter imbedded in his abdomen, the back of his head smashed, the quick, meticulous brain destroyed.

Later he opened his eyes again, to watch the ambulance ship settle. The medic jabbed him. He drifted away.

"This one took it in the breadbasket," the medic said dimly, beside him.

"This one too. And the back of the head. Think they can combine the pieces?"

The voice beside him said, disinterestedly, "Oh, they'll patch something together."

Consciousness-remembered faded, momentarily.

But the green mist had suffused the cubicle. Johns's mind remained mercilessly clear, relentlessly unfolding the film of memory. He screamed, hoarsely.

Because next he would open shock-blurred eyes upon the ceiling — *that* ceiling, white on white. He would roll his head, see his brother — Albin — face down upon the adjacent stretcher. His own stretcher would detect consciousness, would clamp its mask to him. Then —

He fought as Miss Kling rammed the inhaler home. Then he fell heavily upon the bed Turber had vacated. Miss Kling pulled a mask from her belt and applied it to his face.

"You yourself again?" she rasped after a while.

"I guess so." It seemed an unfair question, since he wasn't absolutely certain just who himself was.

She removed the mask. A small mirror lay on the bedside table. Johns studied the dark, intelligent face that was his, yet wasn't.

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"I have a few more calls to make," Miss Kling rumbled thoughtfully. "But I'm going to get you right down to the hypno chamber, before you blow again."

Stumbling, he followed her down the glowing corridor to the door marked by the giant, hypnotic eye.

"You step inside, young Johns. There'll be someone right with you. They'll get your memory pruned back the way it should be — cut that dead wood out and throw it away. And they'll give you something to keep it that way."

He pushed the door obediently.

At the last moment, she squeezed his arm roughly. "You're a good boy, Johns. Both of you." Her lips scraped his cheek.

Numbly, he stepped into the darkened hypno chamber.

Minutes later — or was it hours — he sat high above the cubic jumble of Cleveland General, at the controls of his saucer. He put the saucer on auto and glanced through the papers in his hand.

Funny. He must have used a machine in the director's office to type the material, while it was still fresh in mind. But he didn't remember doing so. And the stuff wasn't even in his usual style. He'd have some rewriting to do.

He glanced over the paragraph about Miss Mabel Kling, senior social worker. He smiled. She sounded like a salty old character. Too bad he hadn't met her in person. But if Tac Turber was still in Florida on recuperation leave next month, perhaps Johns would be back.

He stuffed the papers into the carry-bin, along with the big jug of violet capsules labeled, "Two daily. For memory." Swooping into the clouds, he slid the hatch to feel the cool breeze of altitude on his face. The sun blazed. The skylanes stretched blue and inviting. Even at this altitude he could feel spring easing warmly, greenly over the earth.

A thought flowered in his mind as if it had been planted there. He examined it, smiled, and took it for his own: A great day to be alive!

— SYDNEY VAN SCYOC

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THE WARBOTS

by LARRY S. TODD

Illustrated by TODD

The history of armored war from 1975 to 17,500 A.D.

With the improvement of lethal weapons, soldiers on a battlefield have shown great and understandable interest in staying out of the line of fire. In early wars, where sticks, stones, and lances and bows were the main medium of battlefield commerce, this goal could be accomplished by hiding behind any bulky object, or through desertion. However, as time went on this became increasingly difficult. Either the bulky objects were not as strong as they had been once or the weapons used were less aware of said barriers. Some soldiers adopted a rigid code of martial etiquette and tin suits, but the effectiveness of the knight grew limited when gunpowder was invented.

In the twentieth century great powered suits of armor, called "tanks," came into common use. They required a concentrated barrage to stop them and definitely provided their pilots and crew a more salubrious environment within than they could expect to find without. Nonetheless, a tank still had a great deal

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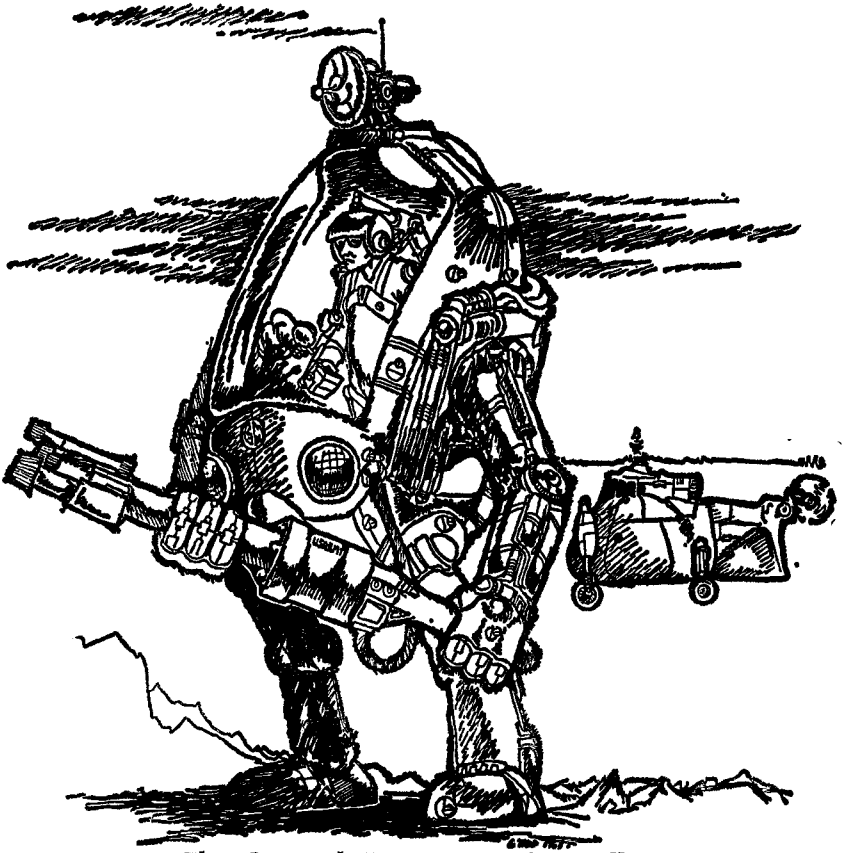

The General Motors Terrain Walker

of vulnerable places, was far too heavy and noisy and had limited mobility. In the 1970's the tanks which were covered with borosilicate fiber plates were much lighter and more mobile than their predecessors, but still lacked ideal conditions for operation. They could not wade through swamps nor avoid being attacked from behind any more easily than the old tanks, nor could they retreat very fast. Clearly, there had to be something better.

The General Motors Terrain Walker ca. 1995

Originally developed for construction work and back-eche-

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lon packhorsing, the GM Walker was quickly accepted by the armies of America, Earth, when it was proved that the machine could carry a gun. Standing twelve feet tall and weighing eight tons, the Walker could stride down a highway at 30 mph and do twenty mph on rough terrain, such as burnt-out slums. Nuclear powered, it required little servicing and often powered its weapons directly from its own power system. Great hydraulic pistons operated its arms and legs, which followed every movement made by the pilot. The pilot was strapped in a control cradle that translated every motion to the Walker, and he had a clear view fore and aft through a plexiglass bubble. The Walker was equipped with a wide range of sensory devices, among them snooperscopes, radar, amplified hearing, some primitive smell-detection devices and tactile pads on the hands and feet, all of which were wired to the pilot.

It was equipped to retreat fast, attack faster and explode when hit with a satisfying nuclear blast. When this was commonly learned, there were very few enemy soldiers who were willing to harm the things, which made them extremely effective in clearing out potential battlefields. But it also made getting them to a battlefield to begin with a touchy proposition. Few soldiers liked sitting on an atomic bomb, even though it would only go off if they were killed, and a Geneva Convention in 1992 declared them formal nuclear weapons.

However, with the turmoil of the late twentieth and early twenty-first centuries growing out of hand, they were used with increasing frequency.

In October, 2000, an armed insurrection in Harlem City, America, caused Walkers to be brought out into the streets. Patrolling the city with squads of armed soldiers (and their nuclear explosion capacities secretly damped), they effectively cleared the rioters out of the burning city and into a large prison combine, where they were kept until their tempers were drowned in rainy weather. Of fifty Walkers shipped in, only two were disabled. One had a department store, its pilot had rashly pushed over, fall in on it; the other had broken legs from a kamikaze automobile.

In November, 2000, the great series of civil wars in China were formally entered by the United States of America, Earth, and Walkers painted with ominous designs marched through the burning cities and villages, panicking those Chinese who would be panicked and nuking those

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who felt compelled to fight back. Four nuclear explosions in Peking were enough to show the Red Chinese that fighting the things was useless, so they were given a wide berth and finally succeeded in bottling 90% of the Red Chinese army in a small part of Manchuria, Earth.

In February, 2002, there were massive earthquakes all over the globe. Japan sank beneath the sea; California followed suit; the coastline of Europe would never be the same, and America's east coast was washed clean by tsunami.

A few months later the Mississippi Valley collapsed, creating an inland sea in America. With three-fifths of the human race wiped out, the remainder lost all further interest in conflict and turned to more immediate and peaceful pursuits, such as cleaning up after the party.

The Walkers were instrumental in assisting in heavy construction. They rebuilt the foundations of cities, realigned the world's power conduits, built dams and, in one fierce burst of zealous activity, built almost a hundred thousand miles of beautiful roadway in four years. Three years after that commercial aircars were produced in profusion. The new roads were ignored and slowly cracked while approaching obsolescence.

The McCauley Walker
ca. 2130

2130 was an eventful year. The first complete cities were incorporated on Mars; the moon formally declared independence of the Four Nations of Earth; the first non-government sponsored spaceship lines went into business, and a new Walker was released to the antiriot squads.

Called "pinheads" because of its set of electric binoculars (which could see from electricity up through the spectrum to x-rays) which functioned as a head, the McCauley Walker had far more flexibility than the GM. Nearly sixteen feet of tempered aluminum and borosilicates, yet weighing only four tons, the McCauley could duplicate all human movements except those requiring bending in the trunk or waist. It could run 55km/hr, was able to lift objects of up to ten tons and turned out to be a massive failure.

The McCauley Walker was a total weapon, designed for optimum placement of components in the least space. The structural members were cast or electro-blown around the defense systems, so that it was impossible to deactivate them. The defense systems were inexorably bound with the machine's own conscious battlefield computers. To acti-

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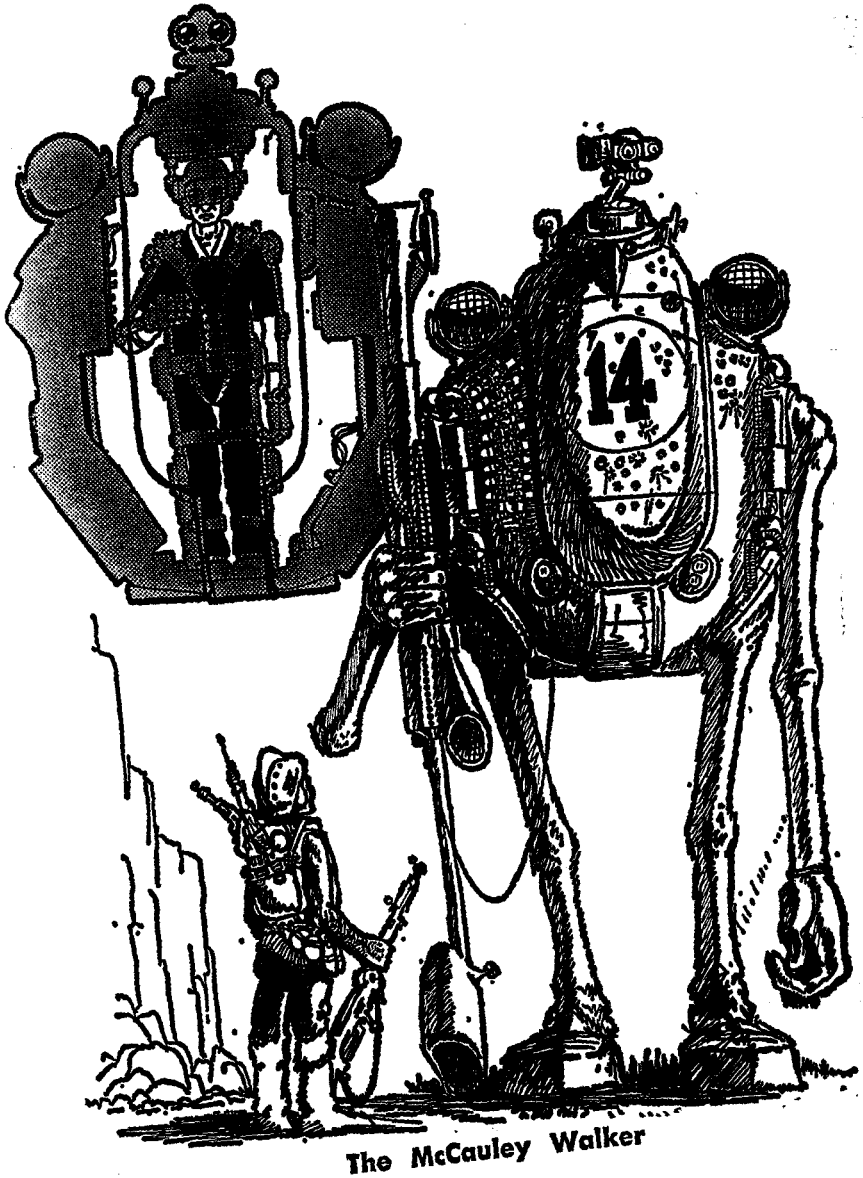

The McCauley Walker

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vate the Walker meant it would at once be at top fighting condition, ready to blast out with weapons which could not be removed from its hull without expenditures of twice its original cost. This did not make it a noteworthy construction machine. Its one experiment in this use had it firing lasers at bulldozers, graders, solidifiers and road crews. The unions kicked up a fuss. It was obviously not a very good construction machine.

Ten thousand of them were built at a cost of two million credits apiece, and it cost four thousand credits to maintain each per year, whether or not they were used. A fortune was spent on the hundred acres of sheds outside of Indianapolis in which they were housed, and it was here that the Walkers remained for eighty years, unused except for occasional exercises to keep them from rusting or whatever it was they did. But there were no wars. Riots were fairly common, but rarely large enough for Walkers to be brought out for them, and never located close enough to an airport to have Walkers in on them before they were effectively over.

In 2210 the Martian Colonial Government declared formal independence of the Four Nations of Earth and confiscated all Four Nation military property to see that their constitution was respected. It wasn't however, for the Four Nations were full of people who would suffer great financial losses if Mars became free. So the First Interplanetary War was begun.

Terran troop transports landed four hundred Walkers on the Syrtis Greenspot, where they were jeered and mocked by a large army of Martian colonists. Following the Martians out across the desert, the Walkers made rapid progress on them until the old plastic sleeves that kept dirt and abrasives out of the leg joints began to crack from age. Martian sand got in and jammed the joints, and the Martian Colonial Armor walked a safe distance around the field of immobile Walkers, attacked the Terran positions from behind and won their independence. It was never disputed again.

The Burton Damnthing
ca. 2680

There seemed to be little reason for the development of more advanced power armor until about 2680, for the solar system enjoyed a period of unparalleled peace, productivity and leisure. With great space vessels over a mile in diameter, powered by nuclear inertial drives, men traveled near the speed of light and

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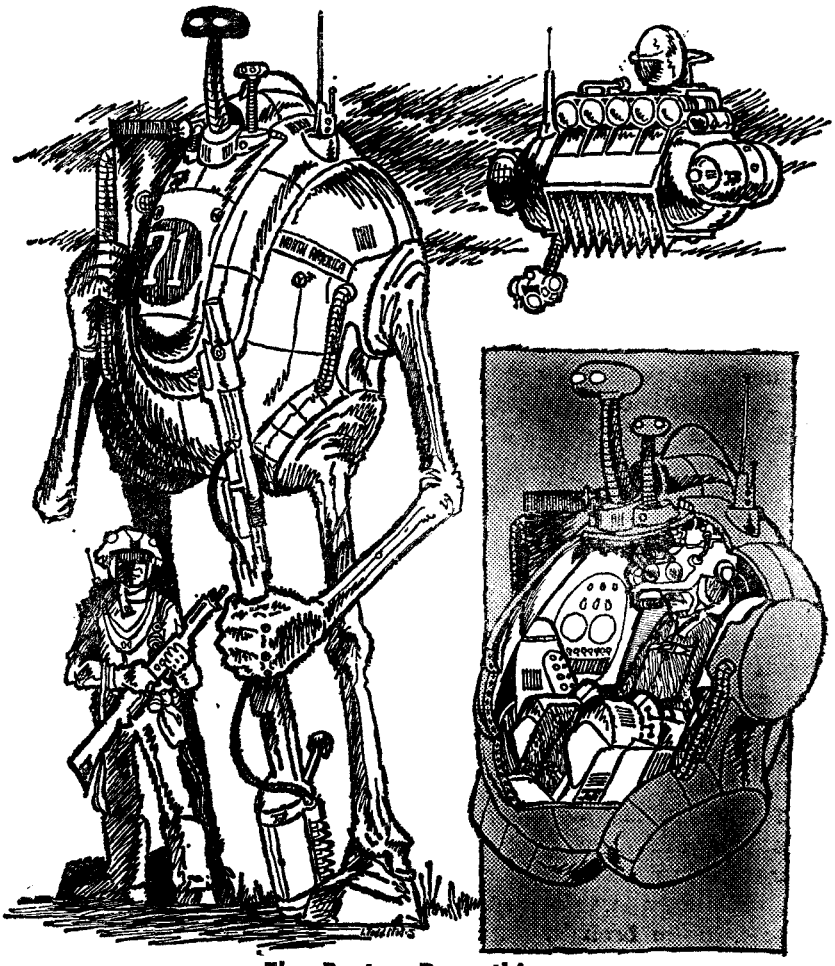

The Burton Damnthing

colonized the near stars, where they found a surprising profusion of planets. In 2548 the Helium Distant Oscillator was developed, making instant interstellar communication possible, even though actual travel still took objective years. From the device, the human colonies could reap instant benefit from discoveries made years of travel away. Many of the great C-jammers, as the huge interstellar vessels were known, were dismantled and

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sold after this, till only about 70 were being used, mostly for carrying great big things which weren't likely to change much in coming years. Terraforming tools, multiforges (the all-purpose manufacturing tool of the day), great generators for increasing or decreasing gravitation of planets and moons, even little C-jammers — and colonists — were the major items of trade, with a few luxury items thrown in for balancing the tapes.

On the fourth planet of Procyon there dwelt a race of intelligent lizards, the Kezfi, who were in their early atomic age when the human colony was set upon the seventh planet. Moss, the colony, was a difficult world to tame, and the Kezfi were more than delighted to trade labor for the secrets of making spaceships. This went on from 2570 to 2680, when Moss had a population of nearly ten million, three terraformed moons and several rocks in the nearby asteroid belt that replaced a sixth planet. The Kezfi were becoming quite avid colonizers and rather sophisticated in the ways of space. They began to have reservations about the presence of humans in their solar system, for these humans were of another star and were occupying a planet which otherwise would have been Kezfic. A war began, and the Mossists needed a weapon which could be used effectively against the Kezfi.

The Burton Damnthing was a sophisticated instrument. Its shoulder and hip joints were friction free, being cast of amorphoid iron. Just as a toy magnet will cause a piece of thin iron to twist and bend without actual contact, amorphoid iron could twist and contort itself on a massive scale, controlled by banks of magnets and topological distorters, yet lose none of its strength and hardness. However, due to the size of the magnet banks, its use was restricted to the major joints, the elbows and knees being cloth-sleeved mechanical joints.

Unlike the two previous models, the Burton Damnthing did not use a control cradle for the pilot. Instead, the man sat in a large padded seat, strapped into assorted nerve-induction pickups. It was as though the Damnthing was his own body.

On Armageddon, Alpha Centauri II, animals with multiple heads had been discovered. Due to the violent ecology, they had been forced to develop a sense of perception that extended in all directions, to warn the major head about potential danger. Called Cohen's Battlefield Sense, it was brought into the Damnthing to detect lurking Kezfi. The lizards squawked when found

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out and never could quite understand how their hiding places were located, since they were self-admitted experts at camouflage.

On the right shoulder of the Damnthing there was a large socket to contain a device called a battleraft. It was a small, condensed version of the offensive weapons of the Damnthing, floating on inertial and antigravity drives, powered by a fusion pack and controlled by a specially educated chimpanzee brain in aspic. Since the battleraft was as effective 500 miles from the Damnthing as 500 feet, it removed some of the intimacy from death. This rightly concerned the Kezfi, who liked a personal confrontation with their assassin, on the logic that he might be taken with them. Not being able to enjoy the Kezfi's Honorable Death at the hands of these dirty fighters from another star, the lizards decided to call it quits. And, not being proud or anything, they decided further to let them have Moss and its moons, and they would stick to what they had been allotted.

The Christopher Warbot
ca. 3250

The Kezfi, as has been said and is probably known by most readers who have known them, preferred to die the Kezfi's Honorable Death and could not understand the sending of men into war in armor. They assumed these things must be robots, then, since they had never been able to get one intact enough to study, so they built their own teams of war robots, called them and the human armor "warbots" and by 3250 decided they had grown weary enough of resident humans to start another war.

At the battle of Granite Rock, in the Procyon Asteroids, the Kezfi first learned about the new Christopher Warbot. They also learned the ineffectiveness of sending remote control robots into battle against manned craft.

After a number of crushing defeats, and a few surprising victories, the final blow was put on the second war of Procyon when the C-jammer Brass Candle, massing 55 million kilotons and traveling at .92C, smacked violently into their major colony of Daar es Suun, killing over a billion Kezfi. After this impressive disaster, nobody, Kezfi or human, was very willing to press his point further.

The Christopher Warbot had no legs, but floated on inertial-antigrav pods which enabled it to work as effectively in space as on the ground. On its back was a complete service and repairs center for the battleraft, and on its front, on either side of the en-

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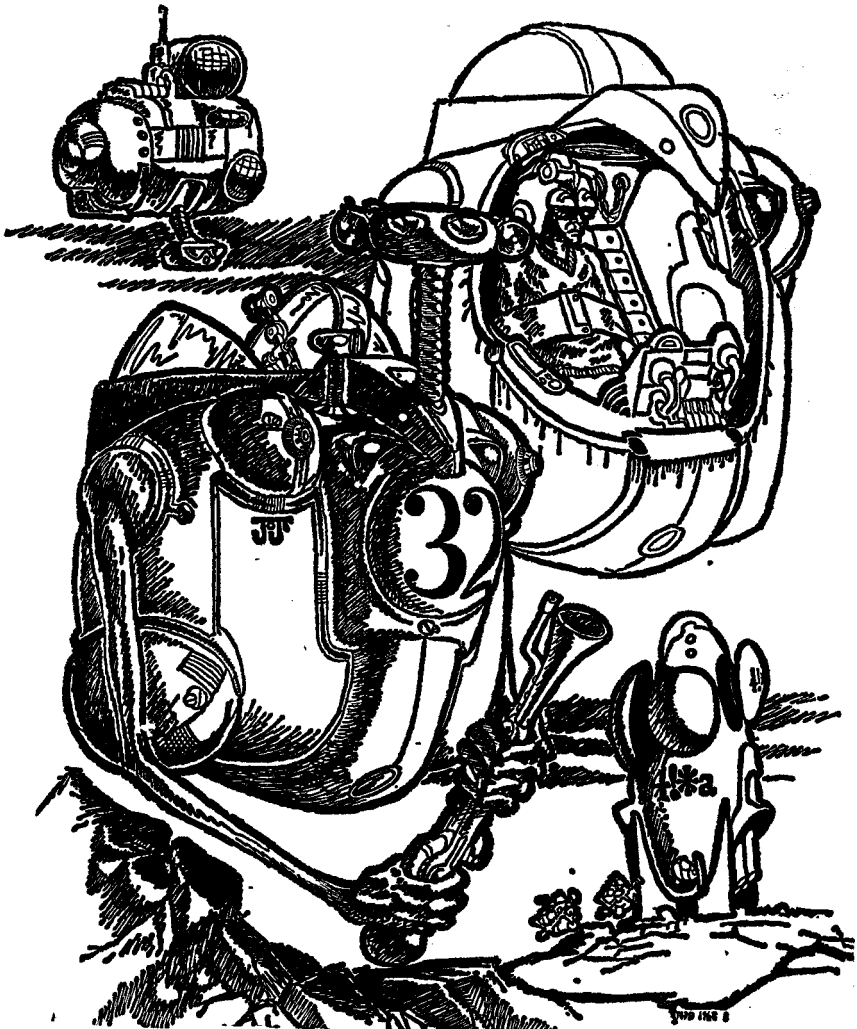

The Christopher Warbot

trance hatch, it bore twin electric cannon. The study of amorphics had developed to the point where an entire arm could be made of amorphoid, though it was limited to bending at the appropriate places a human arm would bend. Since nobody was

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quite sure how to go about bending the artificial arm where there were no joints in their own, this did not disturb anyone deeply.

The only nerve pickups were those in the seat cushions and the helmet, but the soldier had better than ever control over the machine. The entire surface area was sheathed so that it could feel pain and pressure from bullet strikes, and thus Cohen's Battlefield Sense was implemented by another protection device. The head, now attached through a long tentacle, held eyes, ears, and other senses, and the mobility of the Christopher Warbot was such that it replaced most other forms of heavy armor. War was becoming less burdened down by killing machines.

Greedy Nick's Warbot
ca. 4721

In 3579 a stardrive was finally developed, and humanity emerged from the Slowboat Age to the Age of Expansion. Most of the C-jammers were outfitted with drives and used to set up enormous colonies in one blow, and since a light-year could be covered in somewhat less than two days, colonization went on rather rapidly. In 3900 the Cuiver Foundation went far beyond borders of human space and established the Antarean League among the ninety-four planets of Antares, the seventeen planets of Antares's Green Companion star and assorted dwarf stars in the adjoining locality. Since Antares was a dynastic monarchy, nobody paid it much attention.

In 4718 a scoutship of Antares came scuttling back to the League bearing great tidings of war, with a race of tall, rust-red crustaceans called Peolanti, who had established a small empire near Antares. The delightful ruler of Antares, Pantocrator Nicholas Cuiver the Greedy, immediately threw a complete travel silence around the League, from 4718 to 4723, at the end of which Greedy Nick announced that the Antarean League now controlled a globe of space forty light-years in diameter. The Peolanti liked to fight from gigantic spaceships, huge portable fortresses, and mobile asteroids, which dictated definite limits to their mobility. Greedy Nick did away with using battleships other than to transport the warbots to the battlespaces, and let the Peolanti try and find them with their poor radar nets. They couldn't compete, or even begin to. A laser beam can be used with fair effectiveness against a big battleship, for at least you know where it is, but little dinky hard knots of mayhem could neither

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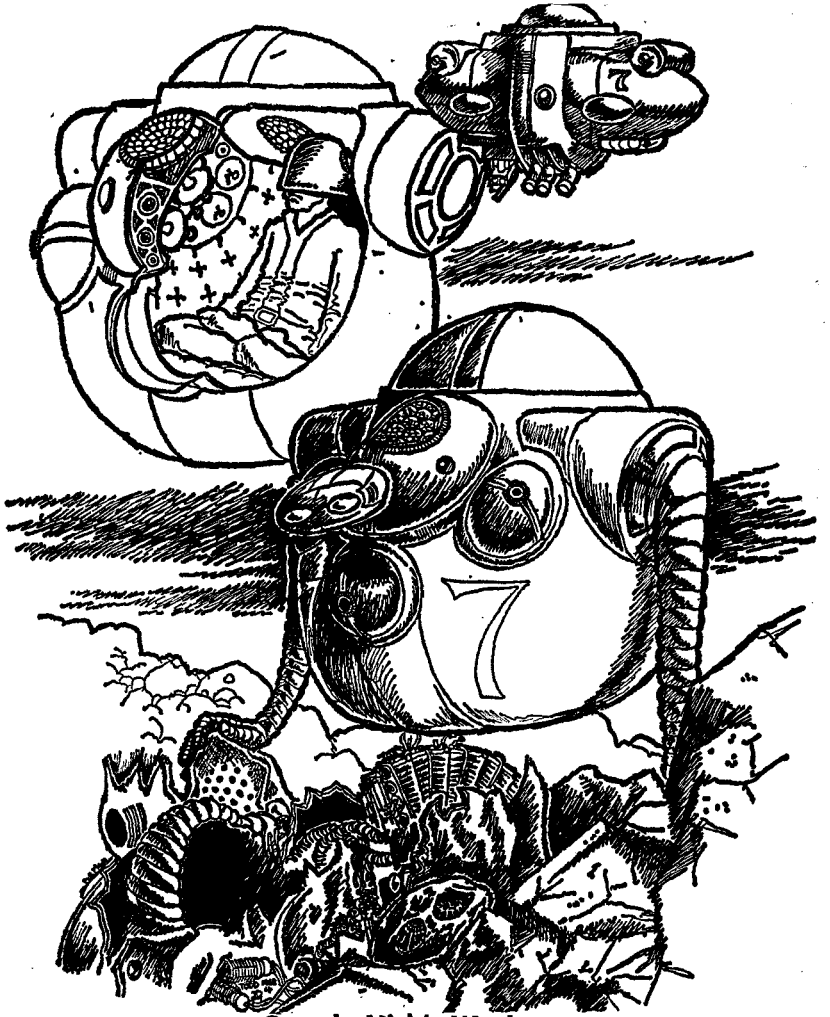

Greedy Nick's Warbot

be seen nor be hit very often.

Greedy Nick's Warbot boasted triple mayhem converters, a nasty weapon which could spit laser beams all the way up and down the spectrum, pull tricks with gravity that resulted in atomic bonds falling apart, heat or freeze things by time-induction, a side effect of the discovery

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of the chronogravitic spectrum. The head was no longer connected to the body, but floated freely and had its own complement of weapons. The battleraft was harder than ever to detect and destroy, being controlled by a brain taken from an Armageddon animal more vicious than a tyrannosaur and of near-human intelligence.

Amorphics had developed a tentacle which could stretch ten times its length for an arm, retract to a wrinkly nubbin, and yet be perfectly controllable by the pilot. He sat in his cabin, which was padded both by cushions and paragravity, free from being bounced around, wearing a helmet and sitting in the lotus position of meditation. In order to properly control a warbot, a soldier had to be an accomplished Yogi.

The Warbots at Critter's Gateway
ca. 7200

While all manner of advances were made in the warbots since the Peolanti wars, and several smaller wars were fought with them, there were no significant changes in their appearance until the discovery of Critter's Universe.

Eleven light-years from Antares there was a small dust cloud which emitted a healthy amount of radio waves. These clouds were not uncommon, so little attention beyond marking it as a navagation hazard was paid to it. Then Jorj Critter, a prospector looking for natural rubies, flew into it. It turned out to be an area in which space had formed a side-bubble, where physical laws were somewhat different. The periodic table of Critter's Universe held but four elements, a solid, a gas, a plasma and a liquid, promptly dubbed Earth, Air, Fire and Water. While perfectly stable in their own little universe, subjecting any object made of them to our physical laws caused destabilization of the Fire content, which caused the whole mass to oscillate into pure energy. Since Critter found it was very simple to control this attempt to justify itself to our physical laws, he told Andrew the Meditator the current Pantocrator of Antares, about this new power source.

Critter's Universe, which is only about a hundred light-years in diameter, did coexist with a large section of the Terran Organization of Star States, who, having learned about this, decided they should own it. The TOSS went to war with Antares, the focal point of the war being around the little nebula, Critter's Gateway. TOSS battlewagons and mobile asteroids faced over

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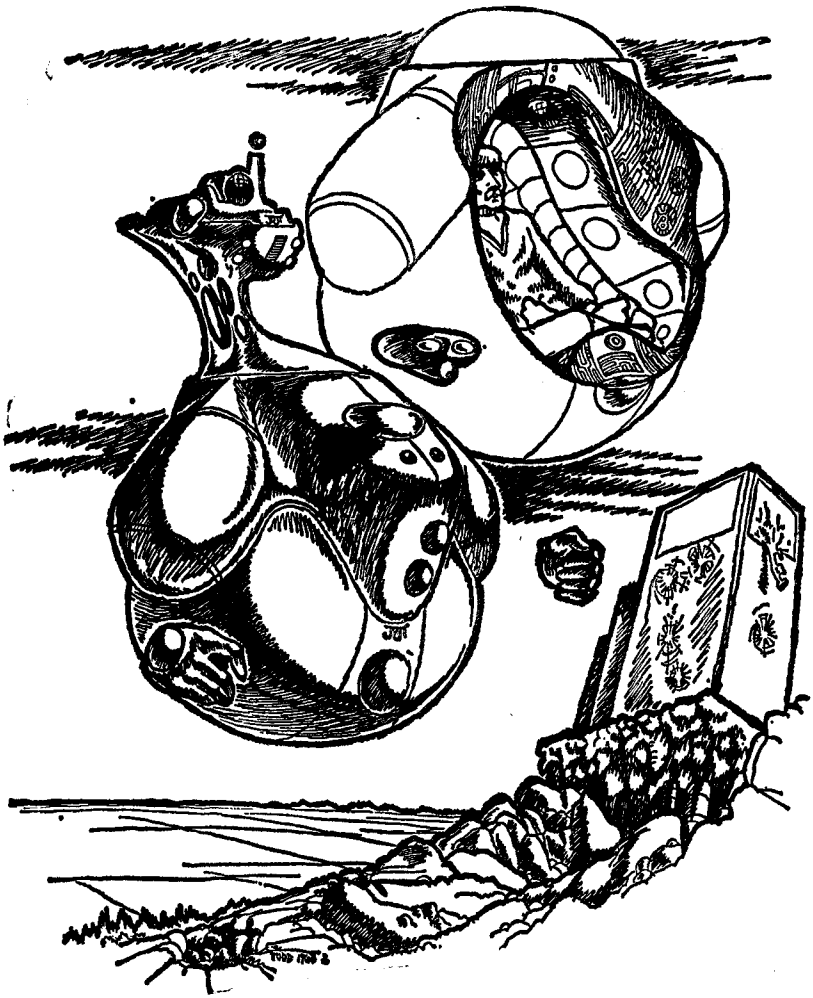

The Warbot at Critter's Gateway

a million warbots of Antares and soon discovered that they could not possibly defeat such a swarm of tiny adversaries. The TOSS never got within a billion miles of the actual gateway and would have lost regardless of whether or not the League pulled another trick from a hat.

For several thousand years, Green Companion of Antares had been known as a tempestuous

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stellar bastard, constantly filling all space around it with radiation clouds and fouling up communications. It had several dozen planets which could be very pleasant if the sun were calmed down somewhat, so the Hubley University extension at Antares Vert, had been established in 6200 to seek ways of controlling the star. Shortly before the war, they found the first major advance of macromechanics, how to blow a star into a nova. It worked as well on stable, main-sequence stars as the huge, wasteful monsters like Rigel, upon which it was demonstrated. The TOSS now realized that the League could seed their stars through Critter's Universe and blow them all to perdition before anything could be done. Hastily withdrawing their forces from the Gateway, the TOSS began cultivating good feelings with forced urgency.

The warbot used at Critter's Gateway was a very capable little vessel, as much spaceship as groundcraft. The soldier, sitting in lotus, was freed of his helmet. From an amorphoid plate at the top of the warbot, he could extrude a battleraft or a head, from two plates at the side he could extrude any of an arsenal of two hundred weapons. The circuitry of these amorphic devices was mostly magnetic and gravitic domains, which could not be altered by any amount of twisting and contorting, so they could be extruded whenever needed, otherwise remaining placid as a puddle of quicksilver in their storage tanks.

Antares, while again the little empire of space, was also the most powerful, for they had over a million of these things strutting back and forth through space.

The Quicksilver Kid
ca. 10,000

By the Eodech (10,000 AD) amorphics had developed a warbot made of nothing but amorphoid metals, memory plastics, solid liquids, contact fields and other prodigies of science. Normally a simple near-globe eight feet big, the "Quicksilver Kid" looked very much like a glob of mercury when in action. Hands, head, battleraft and whatnot could be extruded from whatever part of the surface area they would seem to be most useful, and the weapons system had an additional development.

Hidden in the block-circuitry of the hull was a memory center containing records of every science applicable to military purposes, as well as a mechanical design center, so that a soldier need merely size up the sit-

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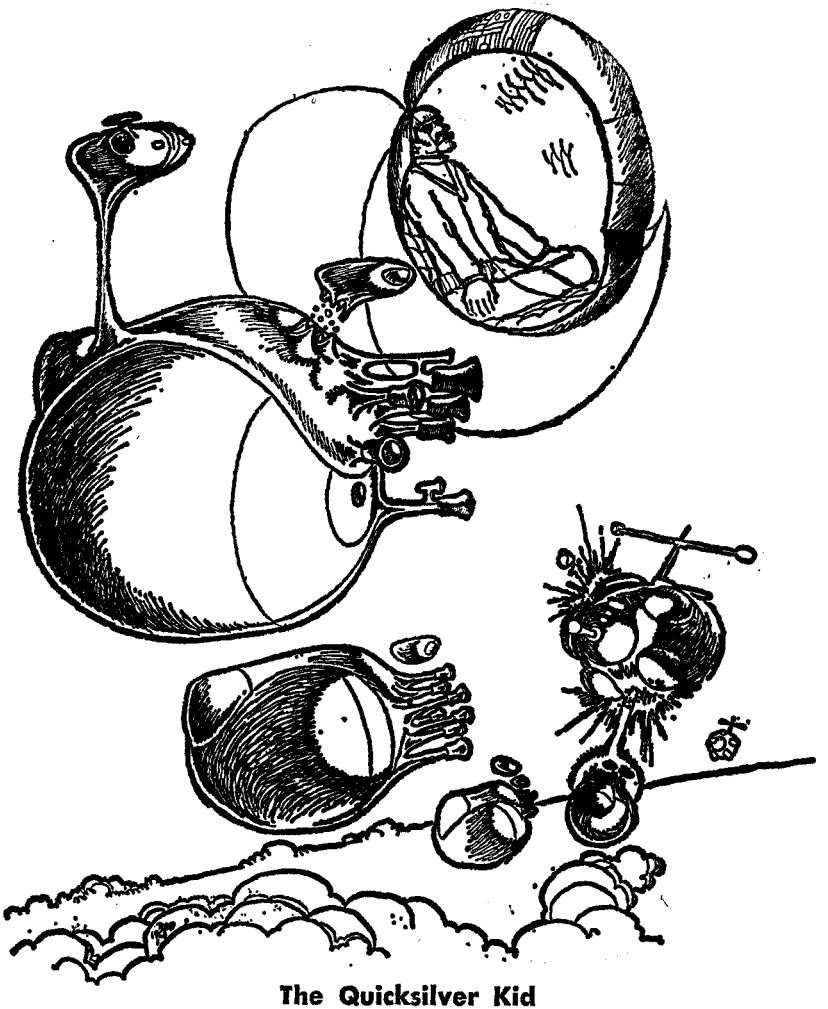

The Quicksilver Kid

uation and inform his warbot to create a weapon equal to it, and hammer away. Powered by anti-matter breakdown, the warbot had more than enough power to see this done. No longer were warbots shuttled about by other spacecraft, but had a speed of about one light-year per hour to make its rounds.

In the Early Eodechtic centuries the Sophisticate Age had

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come about. In known space, a flattened sphere roughly five thousand light-years in diameter, there were seventy major human empires, twenty-two joint human-nonhuman Leagues, one hundred ninety nonhuman empires and fourteen weird things which defied description, save that they seemed to be sociological systems of order originally cooked up by something which could have been intelligent but more likely was something else, the exact nature of which was even more difficult to ascertain. But they never did make any trouble, probably because they found each other and intelligent life even more impossible than we found them.

There were many wars in the Eodechtic centuries, but none of them especially large on the grand scale. But warbots were used in all of them. For example, the Korel Empire Collapse.

The Korel were human adaptations, two feet tall and looking like toy dolls (behaving much like them, too. Korel were well known for their immaturity). They had a little empire flourishing until 10590, when one of their kings went insane on the throne and attacked the Palaric States, which were then growing into importance. The Korel had a few worthy weapons, which aided in their conquering several planets, and then an ally, the Karpo Regime, a race of hideous gray frogs who had been waiting on the sly for some way to build a little empire. As soon as they had done as much as the Korel, the Karpo turned on them and soon had a very effective little empire, as well as a full time occupation in scaring the border stars of the Pale (Palaric States).

An approaching fleet of warbots, after having been ordered to sum up the situation, performed a maneuver which was historical because of its originality. A hundred thousand warbots came together and fused their masses into a thousand medium-sized battleships, which attacked the Karpo fleets. The Karpo fired a salvo at them and broke them all into monolithic chunks of wreckage, which they then went in to investigate. Twisted wreckage, once it surrounded the Karpo fleet, suddenly turned quicksilver, returned to a hundred thousand intact warbots, and destroyed forever the Karpo Regime.

The Korel were chastised mildly. One could never expect much from them in the way of wisdom.

The First Alakar
ca. 11,000

By 11,000, enough was known about force-fields to expect a

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soldier sheathed in them to have as much, if not more protection than an amorphoid shell could provide. The shell was done away with, except for the helmet, and the battleraft was equipped with everything that had previously been reserved for the warbot itself. Since the new soldier appeared to be a man, wearing a small belt and carrying an outlandish rifle, with a battleraft at hell and a small scrap of amorphoid called a "steel pimple" floating about his head, he could no longer be called a warbot. From Antarean mythology the name "Alakar," meaning war-god, was lifted. It seemed appropriate.

The methods of battle were now entirely different. The soldier could fly in free space, though they now returned to the use of spaceships. His forcefields could protect him from the heat of a sun, could be totally impenetrable, or set to pass either matter or energy, but refuse the other.

His body was operated on to the extent of surgical placement of wires which increased his native strength and reflex speed immensely as well as enabled him to rigidify himself for space travel.

An example of fighting methods could be taken from the uprising of Murmash Krodd, on the Chembal Starstrand, 11211.

The First Alakar

Here a fleet of Kroddic ships attacked a small neighboring democracy, and the Humanity Sol-

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diers were requested in. The Krodds saw the human fleet approaching, but it vanished before their eyes, and they could not understand what had become of it until they were recalled quickly by Murmash Krodd himself, who had seen them fall from his skies and subjugate his city in ten minutes.

The method was this: when the Kroddic Fleet was sure to have seen the Humanity Soldiers approach, they snapped on their helmets, activated their fields and took to free space. The ships broke apart in thousands of brick-sized chunks of amorphoid, each reorganized to contain its own drives and control systems. The Alakars and ships did not rejoin until in orbit of Kesal of Murmash Krodd, when they rained down from the sky and forced the fat crustacean to order his fleet back, lest they destroy the planets of Murmash Krodd. When the Kroddic ships were all grounded, the Alakars set solar-phoenix to them, and they burned to radioactive ashes.

The Second Alakar
ca. 14500

The sleek Alakar of the 14500's was respected as being the most capable fighter in space. He controlled six battlerafts, each a featureless egg until ordered to think up a weapon to cover a situation. He commanded three steel pimples, which contained all of his force-field equipment, and, being strictly defensive weapons, never left his vicinity. His uniform was made of bioplastic with layer upon layer of sensory-defector pseudocells, which kept his brain flooded with such an amount of information that an Alakar had to be trained for five years. The helmet, often decorated with fanciful sculpture, feather crests, and back-curtains, could lock every atom of his body to a field that intensified the interatomic bond-strength to a point where he could withstand a nuclear barrage in the flesh, as well as do all the reflex-speedups he needed. Being an Alakar was much like being a superman under LSD, save that the hallucinations were very real displays of actual conditions, which could be interpreted usefully.

The hand weapons were now losing their physical structure with alarming rapidity, the great gaps between parts being filled in with a curious substance called Link. Research in chronogravitics had led to the discovery of how to replace the subatomic bonds of matter, which were an effect of space, with something that was a side-effect of time. This new matter was completely undetectable and very impalpable

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except by a certain set of rules.

If Link were made of pure carbon, one could not force pure carbon through it; it might as well be a brick wall. Carbon compounds moved slowly through it, growing warm as they did so. Things which had no carbon content moved through without resistance, except with the extremely unlikely possibility that two nuclei might collide, which certainly did not do very much.

Link had curious properties of conduction and insulation which made it particularly desireable as a weapon component, notwithstanding the fact that it didn't take up much room.

The Second Alakar was used in several conflicts, among them the most noticeable being the Haak Wars of 14696. The Haak, centipedean creatures from some obscure place in the galactic center, had stretched their empire out in a most curious fashion. Most races preferred to expand in a globe, the center being their planet of origin. The Haak expanded in a straight line thirty light-years across. They had a science of teleportation which could get a Haak on the outside border of his empire, twenty thousand light-years to the center, in two years. They did not do very much work with spaceships, beyond sending robot probes to land colonization reception booths. When the first booths of Haak began landing on human planets in the distant Lace Pattern, the alarm went out. The Lace Pattern was occupied by a large number of little human and non-human empires, none very large, and because it was four years of travel from the Palaric States, the nearest really organized culture, it never heard much from the main body of civilization, except from wandering ships of Alakars. In fact, it was not generally known that all those marvelous myths of Antares, and TOSS, and Pale, and so on, were *not* fairy tales. Few of the Alakars who wandered through the region had ever been anywhere near the Civilization.

The entire war, though it dragged on for ten years, was hardly eighth-page news back in Antares.

The Final Alakar
ca. 17500

Even though Civilization of Humankind (which included almost every alien race that had ever heard of Terra or Antares Imperator) was a growing concern, it had still not explored more than ten per cent of the stars in its own dominion. In some space which both the TOSS and Antares claimed, a new race had come up and were doing

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some exploration and state-building on their own. The TOSS was willing to put up with it only as long as Antares gave them no assistance, but when the Pantocrator, out of the goodness of his heart or whatever, started to assist them with technological gifts, it was too much.

Minor races of the TOSS who felt endangered immediately went to war, minor allies of Antares resisted them, until by 17485 both big empires were ready to blow their cookies and have it out at one another. The race that had started the brouhaha had long since had their fill of imperialism, and were perfectly willing to settle for what they had, but now it was a matter of interstellar pride, and neither the TOSS nor the League was going to be bested. It was a marvelous war.

Antares, who had always seemed to have the last thing to say insofar as weapons advances were concerned, finally sent a squad of Ultimate Alakars onto the field of the war.

The Alakar himself wore no weapons, though he carried a few hand weapons of negligible presence (mostly fashioned from Link), wore no helmet and had six steel pimples which performed all the functions of the helmet, as well as being able to operate as battlerafts. The Alakar, upon landing on a planet which had not been invaded, would immediately alert the civilians to go to the public shelters hundred of miles beneath the planetary crust and take all personal valuables with them. They were given twenty-four hours, but during this time, since the Alakar was almost sure to be under attack, he would certainly be occupied. His steel pimples would head for the nearest masses of amorphoid, often automobiles and private spacecraft, and perform a virus-function. Whatever the amorphoid had been previously would be erased; the pimples would realign and combine all available amorphoid into great robot fortresses, fleets of battlerafts and orbiting platforms, and would infect normal metals with amorphic domain, causing entire communications networks to start converting into amorphoid weapons. If it went on mainly unchecked, within fifty hours of commence-attack, the military command centers buried in the centers of the planets could expect their control panels to swim like quicksilver and turn into atomic bombs.

Fighting back, the planetary defenses would initiate their own amorphic conversions, trying to fight back, and would cause the comm networks to fight back at ground level. Flotillas of plan-

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etary steel pimples would commandeer as much amorphoid as possible, until the entire war began to resemble the attack of a viral disease upon a protoplasmic organism. If the planetary defense won, the Alakar was killed or forced to retreat, and the mass-computer would return every bit of registered amorphoid on the surface to its original state (unregistered amorphoid, such as kitchen appliances, generally kept firing away until told to desist. Registered amorphoid, which had a certain key-pattern built in, instantly reverted).

If the Alakar won, the same thing would be done, except that he would now control the planet and invite his forces into orbit. Since the governments of Antares and Toss were very similar, in basic policies, the civilians rarely cared too much who held the upperhand, so long as they were not too often changed.

Naturally, this being a war, damage was done. A wrecked city stayed quite wrecked, though there was rarely any loss of life. But recovery from an attack took several years, and when Antares finally bested the TOSS, they found that they had a tremendous financial responsibility to rebuild what they had undone.

The Ten Year's War left both empires quite at a loss as what to do, so finally they just got their hands dirty, devalued their currency and rebuilt. But it had been a tremendous war while it lasted. —LARRY S. TODD

Announcing —

THE GALAXY AWARDS

Galaxy Publishing Corporation announces the establishment of annual awards for excellence in science-fiction writing. Every story appearing in the magazines *Galaxy* and *If* in issues dated 1968 will be eligible for the first series of awards, which will consist of:

1968 Galaxy Award
$1,000.00

for the best story of the year. Honorable Mention will receive $250; the next runner-up will receive $100.

The procedure by which the winning stories will be selected is intended to reflect the judgment of the readers of *Galaxy* and *If*. Principal reliance will be placed on a mail survey of a randomly selected group of subscribers to the magazines in making the awards. Questionnaires asking for preferences will be circulated to these subscribers approximately one month after the December issues appear.

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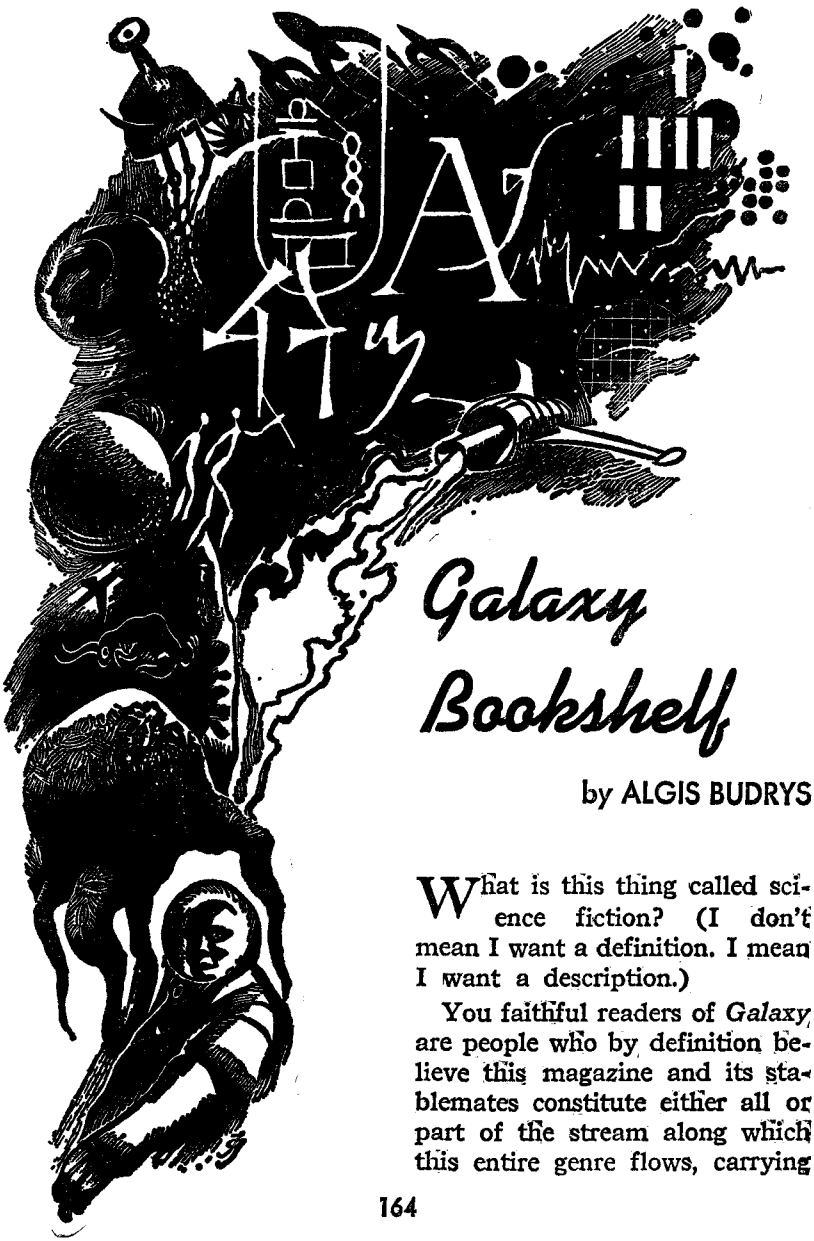

Galaxy Bookshelf

by ALGIS BUDRYS

What is this thing called science fiction? (I don't mean I want a definition. I mean I want a description.)

You faithful readers of *Galaxy* are people who by definition believe this magazine and its stablemates constitute either all or part of the stream along which this entire genre flows, carrying

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on its bosom the struggling, arm-waving horde of those of us people who in some way either contribute to or detract from it directly, each of us desirous, impetuous to some degree, loudly or quietly opinionated, hammering, hammering . . . on what, at what, for what? Want some advice? I cannot advise you. Here are some pebbles from the shore. *Viz.*:

A few weeks ago, I received a forwarded package from the *Galaxy* office, much like any other in which books come. This particular one had originally been addressed to Mr. Frederick Pohl, *Worlds of IF Science Fiction,* which is a little unusual, but not too much so. (People hardly ever spell Fred's first name right, so I thought little about it.)

Inside was a book from Little, Brown & Company, one of the proudest names in American publishing. And in among the flyleaf I found the letter, which I quote in its entirety:

"Mr. Edward L. Ferman,
Editor
Fantasy & Science Fiction
347 East 53rd Street
New York, New York 10022

"Dear Mr. Ferman:

"This spring Little, Brown & Company is publishing a book for older children, MAROONED IN ORBIT, in which you and your readers might be interested.

"I enclose a complimentary copy of the book and if you have any comments about it, I would appreciate hearing from you.

"Sincerely yours,
John G. Keller
Manager
School & Library
Department."

Well, I assume Ed Ferman got somebody else's mail, and I assume I can reply on Fred's behalf if not on Mr. Ferman's. Here goes:

"Dear Mr. Keller:

"I'm replying publicly because you are fair game. Believe me, the comments I might make privately would pale into insignificance those I am about to make here.

"Mr. Keller, MAROONED IN ORBIT barely contains dialogue, much less sensible narrative or any coherent structure of scientific facts. It would corrupt the dull and bore the intelligent child. I say 'would,' hopefully, but in fact it is already in circulation, committing both these sins, in the names of Little, Brown and science fiction, which I respect above many other respectively competitive things.

"Mr. Keller, you must recognize this work as a lightly disguised lecture on science. But why do you assume it is good

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science? Perhaps it seems valuable to you because it is such crude medicine. But if unpalatability seems a logical test for content why isn't it equally true that if the author, Arthur W. Ballou, manifestly can't organize facts entertainingly, he may not have a very organized grasp of science either?

"Surely, in Boston, city of science, there are science writers and editors — some available to you at the lift of a finger — who might have told you this. Many of the brightest intellectual lights of the arts and sciences are not only within a stone's outcry of your window but are equipped, as well, to tell you it's bad judgment to launch Ballous into a field that has Heinleins and del Reys. Juvenile science fiction is a nearly perfected art, thanks to such men. Why have you chosen to start it over?

"Cordially,
A Friend."

Example The Second:

Periodically, I am visited with the products of what I call, generically, Winklequod Press. Winklequod Press — and their emulators at Punchem Silly & Blind, Wringem Drye, and Ne Plus Ultra Impressions — are printers for hire to anyone with a sound credit rating. They are also operators of subsidiary publicity and book manufacturing services, limited distribution facilities, and some kind of clerical force.

Their product comes with a two-color cover done in someone's best high school art class line drawing style. On the back of the book is, always, a small town wedding photographer's portrait of the author. Gentleman or lady, the author peers earnestly into the reader's eyes, over a lengthy bank of type listing his or her credentials as a retired person. When these retired persons have strong convictions, and the convictions have to do with politics or flying saucers, Winklequod sends their work to me.

What comes in is ostensibly a novel about the future revolutionary takeover of the U.S. for the benefit of all mankind. The revolution is either left or right; makes no difference, since the thinking is usually interchangeable in large part. Or else its about someone's ride in a flying saucer. And again, the thinking is nearly always exactly like that in all other books of its kind. Extraterrestrial people with noble thoughts have a limited ability to generate concepts.

Winklequod sends me these putative fictions because they have promised the publisher —

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that is, the author — that they will publicize his book for him by sending it out for review. I don't believe they even wonder why I never review the books they send. They have little financial interest in wondering and in any case they don't know I'm alive. I'm just another item on a list they keep in a folder labelled "sf" or "Saucers," which they turn over to the clerk who touch-types the labels.

What I'm trying to say to you, prospective Winklequod customer, is that it's no good. If you can't get a commercial publisher to take your work, then rightly or wrongly this is a clue that it's been judged to fall short of certain standards. No one is quite sure what those standards are, but they exist, and they are the same as those which place Charles Eric Maine *here*, and J. C. Ballard *there*, only for you they apply somewhat more drastically.

Give up. I will never review your book. I have never reviewed your books when other people wrote them. If I have not in three years given the slightest sign of willingness to perform the act of reviewing them, and Winklequod nevertheless persists, what price Winklequod's promotional efforts on your behalf? I have never seen a review of any Winklequod Press book by any other critic in any other field. Think how many places your money is being pumped down ratholes. Forget it. You can't get through this way.

Harking back to Edward Ferman, and standing on much firmer literary ground, here's evidence of an intelligent, organized, persistent and honorable and yet different description of science fiction.

Mr. Ferman is the editor of *The Best From Fantasy and Science Fiction, Seventeenth Series* (Doubleday, $4.95). F&SF is that magazine, with the antique finish covers, that you find on sale somewhere near this one. Among the names on its cover are some you recognize. Altogether, it seems unlikely you haven't at least picked up a copy and leafed through it.

Some of the stories by unfamiliar names might have been the ones below:

"Cyprian's Room," by Monica Sterba, is ostensibly a story of love, but in fact it's a story about reality, using devices vaguely similar to those in Phil Dick's novel, *The Three Stigmata of Palmer Eldritch*, in which a character in the story becomes a character in and the author of a story being told within the story of what may or may not be a story about love.

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George Collyn's "Out of Time, Out of Place," is a well written story — nearly all F&SF stories show a commendable style of English — and an excellent piece of arranging, about an astronaut who, returning fifty years out of phase with the rest of the world's time, falls in love with and marries the world's most notorious woman. When he learns what she is, he kills her. With her, he kills 200,000,000 of the women plugged into her via electronic tuners. This latter news, which hooks up into the gut, is delivered almost casually. And the meat of the unruffled hero's last line is: "... those ... people had deprived the entire human race of its dignity," which is true, but not quite dramatically equivalent to what passed between Don Jose and Carmen.

The orientation of stories such as these appears to be away from the acts of Man and toward his formulations of them. Rationally, a story like Collyn's goes deeper than what Georges Bizet — or Prosper Merrimee— was concerned with. And *Carmen* is an incredible piece of bombast. Yet Georges wrote some toe-tappin' tunes, while George can be seen to have thought clearly.

Victor Contoski's "Von Goom's Gambit" offers an example. It's laden with great lines, including the one about the woman who gave birth to twins. What she responded to in that wise was being confronted by a repulsive chess gambit. Repulsive because Von Goom, its first promulgator, was capable of thinking in ways so alien to Man that they could be clearly expressed even via the supposedly conventionalized format of the chess game.

Surely, what Contoski does with this supposition is not what A. E. Van Vogt would have done with it, though it approaches what Henry Kuttner and C. L. Moore did in *The Fairy Chessmen*. Contoski's gambit is more elegant, more portable than "Lewis Padgett's" version of a response to this opening. Whereas the novel has to be walked around, and through, you can tell the Von Goom story as an anecdotal jest to pass a few idle moments over a real chessboard.

Among better-known writers' contributions to this book are Avram Davidson's "Bumberboom," a waning-Earth story with excellent detail and, as is usual in the genre, no great resolution. Samuel R. Delany's "Corona," Fritz Leiber's "The Inner Circles," Brian Aldiss's "Randy's Syndrome," and Ron Goulart's "Fill in The Blank" are all good examples of what these people can do, and all but the Goulart combine to form the

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group of the only stories mentioned by title and author on the back jacket copy. Clearly, Doubleday thinks it knows what sells.

Russell Kirk is in this book, though, with "Balgrummo's Hell," an elegantly written story which, sadly, repeats H. P. Lovecraft and a dozen other people when it comes to content. It does no better than they do at getting the essential aftertaste of Masonite out of the filigree sandwich. And Robert Nathan's "Encounter in The Past" is precisely the same as "Digging the Weams," which is to say that it is formulated in excellent prose around an extremely simple philosophical assertion. That's always the problem with getting stories from educated people, they tend to have bright ideas without knowing those ideas have ever been touched on before, but they have; they have, down in the depths where the hacks ply unread.

The difference between writers who are respected by *The Partisan Review,* or who could be respected by it, and those writers who could not, is not one of intelligence or even of storytelling ability. The essential thing that sets Russell Kirk and Robert Nathan apart from Robert Bloch and Arthur C. Clarke is that the latter willingly study the former, whereas the former study their educations.

So this collection from F&SF contains two kinds of stories, really, although the standards of writing are uniform, and high, and the grasp of facts appears to occupy an acceptably even range no matter whether it be Kirk or Arthur Jean Cox whose story we're considering. One kind of story is by people who are engaged with life and use facts to grapple with it and explain it; people like Delany, Leiber, Aldiss, and Davidson, for example and for all they do it in strikingly different ways. Another kind of story is by people who are engaged in some form of professional contemplation, be it as educators, poets, philosophers or whatever. Those people tend to grapple with words and other symbols not as tools but as things in themselves. So they write differently, and they think differently. Somewhere in the area of this distinction is where this collection, and all collections from F&SF, get their distinctive flavor, in some ways like that of all science-fiction media, in other ways very much individualized. It's characteristic that F&SF itself published, and included here, a story that touches rather effectively on this whole business — it's an effective touch, but not too good a story — Thomas M.

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Disch's "Problems of Creativeness."

Now, on the *other* hand, *Analog* 6, edited by John W. Campbell (Doubleday, $4.95), is equally distinctive, equally represents a clearly recognizable branch of the same Big Water in which we all dwell, and yet could hardly be pointed in a more opposite direction. The thing *Analog* has for sale above all others is ingenuity. There are all kinds of stories in this book, from Bob Shaw's classic "Light of Other Days," which tends to make people weep, to Alexander B. Malec's "10:01 A.M.," which gives me the same feeling I got when Dick Daley told Chicago's cops to shoot. But though one is poetry and its polar opposite is raw-bloody-throated reaction, each is based on hard thought about a thing . . . "slow glass" in one case, vehicular traffic management in the other. And I think this was the criterion that caused Campbell to buy them and to anthologize them; before they could even begin to be written down, the writer had to have created and resolved a complete speculative situation in his head. (You can do eight chapters of a good novel about a haunted house before you even have to begin thinking where it will go. In fact, you can finish an acceptable novel about one without ever thinking.)

You see the difference. In the one collection, many of the stories are written to a standard which provides that words make a story. In the *Analog* book, the credo is that story makes words (and "story" is defined somewhat differently, as well).

Yet, both collections are from leading science-fiction magazines, and both magazines deserve to be classified as leaders. So does *Galaxy*. So does *If*. In fact, there are precious few sf magazines which are not leaders in this field, which raises the question of how can we all possibly be going wherever it is?

The ultimate resolution must lie in what the authors do. More accurately, the ultimate resolution at any selected moment must depend on what the authors have done for that moment.

Take a story like "Letter From a Higher Critic," by Stewart Robb. This seems to have been inspired by Campbell's campaign against literati. Yet what it is is "Digging the Weans" with its sleeves turned out, and I don't see how you could find people much more antithetically placed than Robb and Nathan.

Take a story like "Bookworm, Run!" by Vernor Vinge, which staggers along on a collection of mismatched plot cliches that

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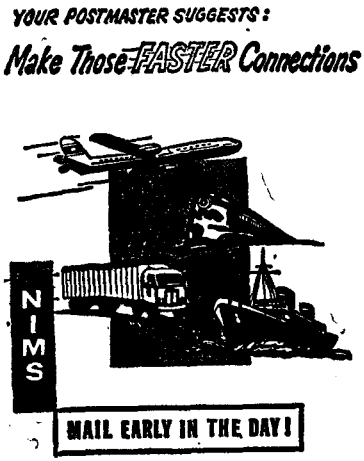
cannot possibly have been intended from the start and are symptomatic of a Campbell story which has not quite been thought out all the way beforehand. Nevertheless, it's a memorable story, because its chimpanzee here, like Algernon the mouse in Daniel Keyes' F&SF story, is an inspiring organism who owes his consciousness and ultimate doom to the intervention, and to the motivations, of mankind. And ultimately the F&SF story was about acts and this ASF story is the lesser of the two, being about words.

And so on. Where are we? Robin Scott's "Early Warning" says it is impossible to watch the watchers. Gordon Dickson's "Call Him Lord" says the watchers have a word for it. Scott's is about words, and an action story shouldn't be about words. Yet Dickson's is an action story about acts which culminate in words, and it's good. Not perfect, but good. It says that cowards cannot administer . . . an everyday reality that somehow doesn't get said very often . . . and it sets its premise in the future, when the cadet rulers of the Universe must first prove themselves against the rural standards of old, neglected Earth. It's a parable, you might say. And then, just before you decide it might tend to describe something about today's sf, you realize it in no wise needs to have been an sf story at all, being about the rites of passage and thus on a subject as old as the caves. But Dickson is a professional sf writer, with sf contacts and an sf audience, so it's an sf story, in a good collection by the famous editor of a leading science-fiction magazine; libraries will carry it, children will read it, enjoy it, take it to heart. Some of them will emulate it, and another writer will add his (supposedly) individual opinion to the description of science fiction.

Where *are* we? Cyprian . . . are you there, in the light of other days?

—ALGIS BUDRYS



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BEHIND THE SANDRAT HOAX

by CHRISTOPHER ANVIL

Illustrated by SAFRANI

Hail to Science the remorseless foe of all ignorance and superstition — and the evidence of one's eyes!

I

Redrust Northeast Bunker, New Venus, July 17, 2208. Sam Mathews, missing converter technician from the Kalahell Solar Conversion District, was today admitted to Redrust Medical Center. Mathews's sand-buggy overturned May 17, in the middle of the Waterless Kalahell Desert.

Date: July 19, 2208
From: Robert Howland, Director, Kalahell Conv. Dist.
To: Philip Baumgartner, Director, Redrust Med. Cen.
Subject: Sam Mathews
Recode: 083KCrm-1

Phil: Hope you will patch

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Mathews up and get him back to us as soon as possible. We are eager to learn how Mathews survived two months in the Kalahell, starting with two one-quart canteens of water.

Date: July 20, 2208
From: Phillip Baumgartner, Director, Redrust Med. Cen.
To: Robert Howland, Director, Kalahell Conv. Dist.
Subject: Weak Patient
Recode: 083kcRM-2

Bob: Sorry, there's no question of getting Mathews back to you quickly. With a sheet and blanket over him, you still see his ribs. Besides, he's incoherent.

July 22, 2208
Howland to Baumgartner
083KCrm-3

Phil: I hope you will listen carefully to every incoherent word Mathews speaks. Please bear in mind, we found his overturned sand-buggy, with water tank burst, *three hundred miles* from Redrust Northeast Bunker. There is no known water in between, and the vegetation is dry as dust from April to Ocnovdec. *How did he do it?*

I August 24, 2208
Baumgartner to Howland
083kcRM-4

Bob: Sorry this reply is late. Our supply ship cracked up on its last trip, with a crew of four and nine offworld tourists. We suddenly had eleven badly burned men to care for, and little time for Mathews. However, we will see if we can learn anything for you.

I August 30, 2208
Baumgartner to Howland
083kcRM-5
Subject: Pure Lunacy

Bob: Sorry, but we're sending Mathews to Verdant Hills Medical Center. Their facility is big enough to handle his case, I think. If not, they will send him to Lakes Central. Too bad, but he went through quite an experience, as you realize.

Purgatory 2, 2208
Howland to Baumgartner
083KCrm-6
Subject: Nut Stunts

Phil: Yes, I realize what Mathews went through: *He crossed three hundred miles of desert on two quarts of water.* That's what I'm trying to find out about. From the heading of your message, I take it Mathews has gotten "mentally unbalanced" now it's time for him to go back on duty. Look, Phil, try to remember, Mathews is a case-hardened "sandrat" of long experience. This is not your average patient. You let a sandrat get his chosen angle on a situation, and he will stand

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it on its head. *Don't* send Mathews to Verdant Hills. Hold him till the cyclone pack goes through here, then *send him to us.* And Phil, will you tell me what Mathews said about his experience? This is important to us here.

Purgatory 16, 2208
Baumgartner to Howland
083kcRM-7

Robert: In dealing with my own patients, under treatment at this facility, I rely on my clinical judgment, balanced by the professional opinion of my staff, and not on sandrat amateur psychology. Mathews has been released, for observation at Verdant Hills Medical Center. And I am not at liberty to divulge confidential details, from the closed files, on this case. *Note, please, that this communication is the 3 th transmission of a series, repeated periodically over land-line central cable, and by semaphore across fault-gaps, crush-zones, and landshifts, and that transmission between remote peripheral stations may be delayed during periods of intense meteorological or seismic activity.*

Hell 14, 2208
Howland to Baumgartner
083 KCrm-8

Dear Doctor: I wonder if, in the full wisdom of your clinical judgment, balanced by all the professional personnel on your staff, any of you qualified people had the wit to try to put yourselves in the place of your lowly sandrat patient, and see how things looked to *him?* What does your clinical judgment tell you about someone who has spent years in the dust-bowl of this poverty-stricken sandpit planet? How will this sandrat react when he gets the chance to be sent, free of charge, to a comparative Garden of Eden, provided he can just *prove* he's *nuts?* I won't waste breath describing the stunts some of these birds have staged, just to get back to Bonescorch for a week. And far be it from me to pry into the confidential privileged communications between you and one of my best technicians on a matter vital to the Kalahell Conversion District. No. Better that my men should die of thirst when their vehicles give out than that you should open your closed files. Sorry if my message seemed unprofessional, Phil. Forgive me for presuming on our former friendship. *Note, please, that this communication is the 6th transmission of a series. . . .*

Date: Hell 30, 2208
From: Philip Baumgartner, Director, Redrust Med. Cen.
To: Quincy Cathcart, Chief of Medical Services
Subject: Interservice Friction
Recode: 082RMmc-1

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Sir: I am sending separately a record of my recent correspondence with Mr. Robert Howland, Director of the Kalahell Solar Conversion District. As the correspondence will show, a difference of opinion regarding medical treatment of one of my patients has caused some friction between us. I call this matter to your attention because of recent failures in certain electrical facilities at the Redrust Medical Center. These power failures, of precisely thirty and sixty-second duration, have formed a pattern which it seems to me could not be random. I do not accuse Director Howland of being the cause of this serious interference, but I feel that this matter should be investigated without delay. I would appreciate your assistance in this matter. *Note, please, that this communication is the 2 th transmission of a series, repeated periodically.*

Date: Salvation 6, 2208
From: Quincy Cathcart, Chief of Medical Services
To: Philip Baumgartner, Director, Redrust Med. Cen.
Subject: Ego Reduction

My boy, if I were a purely conventional Chief of Medical Services, I would have your jackass hide drying in the breeze this minute; but it is your great good fortune that I have a large capacity for suffering fools gladly, and also am somewhat short of replacements for you at the moment. You have committed three really outstanding stupidities. First, you have "pulled rank" on an equal. You may regard yourself as enormously superior, mentally, socially, and professionally, to Director Howland, but kindly observe that Director Howland is *Director* Howland. Kindly do not increase my difficulties by your ineffectual efforts to snub those to whom you are not superior. Second, if you *do* try it, show the forethought not to commit the additional stupidity of voluntarily doing it in fully documented form, where anyone may see your ego, complete with scalpel, stethoscope, and halo, spread-eagled in all its glory. Third, when you *have* done it, do not expect me to get you out of the mess. Just exactly what do you propose that I do? Suppose I should take this matter up with the Chief of Power Production? As he is just as busy as I am, or almost so, he will be in an equally irritated mood after examining the records. Certainly, he will request Director Howland to check this power interruption. However, you may count on it, the field of power-supply zionids, or the theory of tertiary trilovolt transmission zone interactions, or whatever may happen to be involved, will be so abstruse and complex that

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neither you nor I will have any idea whether what follows is justice, persecution, or the operations of someone's sense of humor. Kindly note that I am not interested in becoming involved in this, particularly since this power interruption obviously does not risk your patients' well-being, or you would plainly and unequivocally say so. All it is doing, therefore, is to sweat your ego, and far be it from me to interfere. Permit me, however, to make a suggestion. You, obviously, have two main alternatives: a) You may demand in an authorative way that Director Howland come to heel like a chastised dog. In this case, I strongly suspect that the Director will suddenly discover that your difficulty shows the danger of incipient overload of the flarnitic leads of the intercontinental power net or something equally nice, and a disaster team will descend on you and make your present discomfort look like heaven; b) Alternatively, you might send a simple manly note of apology for your highflown missive of Purgatory 16th, explaining what is doubtless the truth, that you were overtired. Express your willingness to help solve the problem. I fully authorize your opening the files for this purpose. I await with interest the results of your joint investigation of this matter, as I frankly would like to know how any human could cross three hundred miles of the Kalahell Desert alone on foot, starting with just two quarts of water, and with nothing between him and his destination but dried-out vegetation and dust. I am setting additional inquiries in motion on this matter and advise you to start your investigation promptly, if you wish to receive credit for the solution. *Note, please, that this communication is the 4 th transmission of a series, repeated . . . .*

II

Date: Salvation 14, 2208
From: R. Stewart Belcher, Director, Verd. Hills Med. Cen.
To: Quincy Cathcart, Chief of Medical Services
Subject: Sam Mathews
Recode: 081mcVN-2

Sir: In answer to your inquiry, yes, we had a patient by the name of Sam Mathews here. He arrived from Redrust Med. Cen. in a special reinforced straitjacket, and we shipped him out in a padded cocoon. As for his condition — well — if you will permit me to drop the usual lingo, this fellow was stark raving nuts. I would hesitate to try to pin it down any closer. We sent him straight to Lakes Central. He got here Purgatory 16th, and we got rid of him on the 18th. *Note, please that this is the 4 th of a series. . . .*

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Date: Salvation 15, 2208
From: Martin Merriam, Director, Lakes Cen. Med. Cen.
To: Quincy Cathcart, Chief of Medical Services
Subject: Sam Mathew.
Recode: 082mcLM-2

Sir: Yes, we do have a patient here named Sam Mathews. Mr. Mathews is under treatment at our Outpatient Clinic. His case is highly interesting, and, I think, offers many insights into the nature of religious fanaticism. You see, Mathews was employed for years as a technician, tending solar-conversion units out in the Kalahell Desert. One day, while far out, an unexpected tornado hit, his sand-buggy overturned, his water tank burst, and he found himself isolated in this waterless desert. The psychic shock must have been formidable. Tchnudi, who is handling his case, is slowly bringing the infraconscious symbolism to the surface; but, of course, the process cannot be hurried. Subjectively, Mathews evidently experienced a vision, which left him convinced he was under the care of a being called the Prophet of Awashi. Tchnudi, by the way, finds an intriguing symbolism in the name of this prophet." By the time Mathews emerged from the desert, the whole thing was quite real to him. However, his latent fanaticism only burst to the surface when he was told that he was to be sent *back* to the Kalahell. Instead, he insisted that he go on to the "promised land," as the Prophet had commanded him. This incident, I think, offers many possibilities for theoretical insights. Tchnudi is treating the psychosis by what might be called "psychiatric hydrotherapy." The patient is encouraged to swim and boat and is responding quite well, despite occasional relapses. We have high hopes of achieving an eventual cure. *Note, please, that this message is the* 6 *th* . . . .

Salvation 23, 2208
Cathcart to Baumgartner
081rmMC-3
Subject: Sam Mathews

Well, my boy, I would like to know the results of *your* investigations thus far. *Note, please, that this message is the* 4 *th* . . . .

Salvation 24, 2208
Baumgartner to Cathcart
081RMmc-4

Sir: I can only say that Mathews was incoherent when he arrived here and insane when he left.

He appeared to be progressing nicely, but our treatment was interrupted by the crash of a supply ship, so that we necessarily may have neglected Mathews to some extent. *Note, please, that this message is the* 9 *th* . . . .

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Salvation 30, 2208
Cathcart to Baumgartner
081rmMC-5
Subject: Evasion

Dear boy: You may not believe it, but there are worse places on this planet than Redrust. Specifically, let me call to your attention Medical Outpost 116, located in a spot picturesquely named "Ssst," from what happens when you spit on the sand. Outpost 116 is situated in the center of a kind of natural bowl. When the sun reaches the zenith over this bowl, it is possible to be burned simultaneously on all exposed surfaces of the body, whether the said surfaces happen to face up, down, north, south, east, or west. Owing to the really excessive seismic activity in the region, this is a *surface station,* of the type mounted on very large skids designed to flex with the waves when the quakes hit. Unfortunately, the elastic-rebound qualities of the skids sometimes react unfavorably with the seismic waves, so that you are going up when the ground is going down, and vice versa. The mechanical qualities, insulation, *etc.,* of the station have suffered accordingly. Permit me to point out that this outpost has been untenanted for some time, as I have been unable to find anyone with the unique qualities desirable in the occupant of this station. Let me point out, it would be of great value for the Service to know *how Mathews survived so long without water.* Of course, you need not trouble yourself with this problem if it bores you. *Note, please, that this message is the 6 th . . . .*

II August 3, 2208
Baumgartner to Cathcart
081RMmc-6

Sir: I send separately complete copies of all records of this Center pertaining to former patient Samuel Mathews. I realize that it may be of some interest that this patient survived severe exposure over a relatively long period. However, determination of the cause of this anomaly is not possibly with the facilities available at this Center. We lack sufficient advanced computer backup to correlate the data. In any case, data-sifting, data-analysis, and theoretical synthesis is not the function of this Center.

II August 6, 2208
Cathcart to Baumgartner
081rmMC-7
Subject: Reassignment

Sir: Effective on receipt of this message, you are removed as Director of Redrust Medical Center, and reassigned to Medical Outpost 116. You will report to Medical Outpost 116 on the next supply ship, traveling by way of Kalahell Water Extraction Center

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and South Bonescorch Junction. Your assignment is: a) to repair and render fit for occupancy Medical Outpost 116; b) to occupy Medical Outpost 116 until further notice, maintaining it in optimal condition, and duly operating all recording equipment relating to solar radiation, temperature, humidity, atmospheric pressure, wind-speed, incidence and severity of sandstorms, cyclones, groundslips, seimic tremor, etc., *etc.;* c) to render medical assistance to the occupants of the Equatorial Conversion District. To facilitate your medical-assistance patrols, Medical Outpost 116 will be equipped with one (1) Model STV-4 sand-buggy. You are cautioned to operate this vehicle with due care, as vehicle malfunction, especially in the prolonged dry season, is a major fact in the mortality rate of the Equatorial Conversion District. Bear in mind that, due to electromagnetic disturbances, and violent meteorological and seismic activity, outside help is not to be anticipated.

Date: II August 14, 2208
From: Quincy Cathcart, Chief of Medical Services
To: Robert Howland, Director, Kalahell Conv. Dist.
Subject: Desert Survival
Recode: 081MCkc-1

Sir: I am sending, separately, recordings of Sam Mathews's conversations at Redrust Medical Center. It would appear that he expected to die and was passing along information he considered important. For instance, there is the following:

Attendant: Don't overtire yourself, Mr. Mathews. Just settle back.

Mathews: No. I've got to tell—

Attendant: Not now.

Mathews: It's for my buddies. Look —

Attendant: Lie back, please. Don't overtire yourself.

Mathews: Who cares? I know I won't make it. Somebody else can make it. Listen —

Attendant: Of course you'll make it. Now, I've got to give you this —

Mathews: Write this down, will you? The rat story's right. You can eat grass and all. You can eat dry scratchweed. You can —

Attendant: *Sure* you can.

Mathews: You've got to get one *alive*. You can't cook it.

Attendant: Just lie back.

Mathews: Are you going to write it down?

Attendant: Sure. Let me just pull your sleeve up.

Mathews: *Then* you can eat anything. Even scratchweed. It turns to water in your stomach.

Attendant: Just lie still while we get the hypogun . . . . *There.*

Mathews: Are you going to write this down? Do you follow?

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Attendant: Sure. You don't cook the scratchweed. Now—

Mathews: *No! You don't get it!* It's the *rat* you don't cook!

Attendant: Sure. Sure. You cook the weed, you don't cook the rat. Lie back.

Mathews: It's not . . . you eat it raw . . . the weed . . . you wouldn't, anyway . . . .

Attendant: Lie down, now.

Mathews: No . . . . But the rat . . . you . . . important to remember . . . the rat . . . .

Attendant: Sure . . . . Whew! He's under. *Finally.*

Dr. Hinmuth: Try to keep your reassurances more general. Avoid specifics.

This conversation seems to show Mathews trying to get *something* across. I would value your opinion as to what this something might be.

Date: 11 August 18, 2208
From: Robert Howland, Director, Kalahell Conv. Dist.
To: Quincy Cathcart, Chief of Medical Services
Subject: Desert Survival
Recode: 081mcKC-2

Sir: Many thanks. I've wanted these records for a long time. As for Mathews's "rat story"—that's a kind of legend. The basis is a creature called a sandrat that burrows at the base of the larger chalaqui weed and sunrustle stalks. This creature is active while other local life is estivating. The legend is that if a man will catch a sandrat, cut out its digestive tract and eat it raw, he will be able to live in the desert without water. This is supposed to have been the secret of "Desert Bill," an early settler renowned for his ability to survive the desert. I've never taken the story seriously, and considering what you have to do to test it, I don't know anyone who *has* tested it. But I'm calling for volunteers.

September 17, 2208
Howland to Cathcart
081mcKC-3

Sir: Well, it took work to find volunteers, and I had to offer a week's leave in the worst fleshpot in the hemisphere. But we have now tried it out. Don't ask me how it could be, but one volunteer went almost three weeks without water, and another went sixteen days. This won't convince everyone, but I'm notifying all the conversion districts. Now, if a man gets stranded, he has a chance.

September 19, 2208
Cathcart to Howland
081MCkc-4

Sir: Congratulations. I now have a cage of sandrats myself, but no volunteers. What's the name of that fleshpot? Once I have volunteers, I intend to im-

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pose controls so stringent no one in his right mind can question the results. Of course, that won't include everybody.

III

Princeps, New Venus, Ocnovdec 30, 2208. Dr. Charles de P. Bancroff, Director-in-Chief of the Interscience Federation today rebuked Dr. Quincy Cathcart for his "sandrat hoax."

In an unprecedently severe public statement, Dr. Bancroff charged: "This absurd parody of an experiment exposes New Venus Science to the ridicule of more mature scientific bodies everywhere. Numerous palpable errors in this widely publicized — I might almost say widely advertised — report qualify it as a treatise on 'What to Avoid in Science.'

"To begin with, the sample employed *was not pure.* Assuming the results to be as stated, no one could say what agent or agents were responsible.

"Second, it is absurd to suggest that such results *could* be possible; obviously, digestive action would destroy the ingested tissue, and with it its presumed magical power to change food into drink.

"Third, even assuming the ingested tissue were *not* digested, peristaltic action would reject it from the body.

"This should give some suggestion of the flaws in this 'experiment.' Even laymen can understand such fallacies.

"However, to the scientist, other flaws are at once evident. This experiment is not 'elegant.' It lacks the sense of 'form' which gives the conviction of validity. Moreover, there is nothing quantitative about it.

"There can be no excuse for such an imposture.

"I call upon Dr. Cathcart to publicly admit that this so-called experiment is nothing more nor less than a hoax. This may, at least, permit New Venus Science to regain some shreds of scientific credibility."

Operations Central, New Venus, Janfebmar 4, 2209. Dr. Quincy Cathcart, Chief of Medical Services, today replied to the criticism of Dr. Charles de P. Bancroff. Referring to Dr. Bancroff as a "pedant laboriously mining his rut," Dr. Cathcart stated:

"In the formal organization of which we are both members, Dr. Bancroff is an administrator, not a scientist. As a scientist, I decline to accept any judgment based on Dr. Bancroff's opinions. That his statement is unscientific is easily shown:

"1) He bases his argument on the grounds that my experiment might cause 'New Venus Science'

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to lose caste in the eyes of others. This is suppression of data for fear of unpopularity.

"2) He states that the experiment cannot be correct, because it disagrees with his presuppositions. This is the attempted refutation of physical facts by favored theories.

"3) He objects that the experiment is not 'elegant,' and hence cannot be true. This is the subordination of Science to Esthetics.

"4) He complains that the experiment is not 'quantitative.' Note that *each* volunteer ate *one* sandrat digestive tract and then, while carefully and continuously supervised, existed for stated days, hours and minutes without drinking water. All that is required of an experiment is that it proves a point, and that the facts be so reported as to be capable of independent check. It is unscientific to include irrelevant data and superfluous charts and calculations merely to make the experiment 'look scientific.'

"My learned colleague's objections are those of the scholastic pedant, not of the scientist.

"In science, theories are based on *facts*, not vice-versa."

Princeps, New Venus, Janfebmar 6, 2209. By 8-4 vote, the Personnel and Appointments Committee today fired Dr. Quincy Cathcart, Chief of Medical Services. By unanimous vote, the Committee on Professional Conduct formally censured Dr. Cathcart for "unprofessional conduct."

Rathbone, New Venus, Janfebmar 8, 2208. Dr. Quincy Cathcart, former Chief of Medical Services, in a brief statement commented on his expulsion from office and the formal rebuke delivered by the Interscience Federation. Dr. Cathcart said:

"By these measures, the governing bodies of the so-called Interscience Federation reveal themselves as composed largely of sycophants, obsequious to an administrator who, as I have demonstrated, does not know what science is. These people may, of course, take their stand with whoever they wish. I will stand with Galileo."

Princeps, New Venus, Janfebmar 8, 2209. By 7-5 vote, the Committee on Accreditation today placed Quincy Cathcart on "indefinite suspension of professional status." A spokesman explained: "This means Cathcart cannot practice, and further that no paper or presentation of his may be considered by any accepted medium for the dissemination of professional information or opinion."

The action was taken "to avert harmful public controversy."

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IV

Rathbone, New Venus, April 16, 2209. Two magnetic-sieve prospectors reached here today, haggard from exposure and lack of rest, to tell of a waterless trek across the Salamari Waste. They attribute their survival to "travel by night, an accurate map, and two raw sandrats."

Flarnish, New Venus, May 1, 2209. Doctors here are puzzled by the case of a fourteen-year-old boy who eats grass, refuses to drink water, and apparently suffers no harmful effects. He insists he ate a sandrat.

Bonedry, New Venus, May 26, 2209. Hank J. Percival, proprietor of the Last Chance Supply Mart, reports a brisk sale of sandrats to prospectors, surveyors, and cable riggers, setting out across the Bonescorch Plateau.

Princeps, New Venus, May 29, 2209. Experiments carried out under the auspices of the Interscience Federation "demonstrate that the effectiveness of sandrat ingestion in preventing dehydration is a myth. Careful experimentation with measured quantities of crushed digestive tissues of laboratory sandrats shows no statistical increase in resistance to dehydration."

South Bonescorch Junction, New Venus, June 10, 2209. Philip Baumgartner, from Medical Outpost 116, collapsed shortly after arrival here this morning. Baumgartner explained that his sandbuggy broke down "ten to twelve days ago" and he'd been on foot ever since. A small wire cage lined with sunrustle stalks, and now empty, was found secured to his pack straps. Such sandrat kits are sold locally for use in case the purchaser gets lost without water.

Princeps, New Venus, June 22, 2209. By order of R. Q. Harling, Planetary Food and Drug Administrator, all sales of "sandrats or related rodents, for use in preventing dehydration," were today forbidden as "dangerous to the public health, both directly in light of possible infestation by possible indigenous intestinal parasites and indirectly because of the mistaken belief that sandrat internal organs are a specific against dehydration. This myth has been thoroughly exploded by controlled scientific experimentation."

Bonedry, New Venus, June 26, 2209. Hank J. Percival, proprietor of the Last Chance Supply Mart stated today he is continuing sales of sandrats, "as pets."

Broke and Ended, New Venus,

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June 27, 2209. Sandra Corregiano, a missing tourist on the Trans-Desert Safari, was today brought out after an extensive search around Mineral Flats. Miss Corregiano explained that she had caught a sandrat. "I hated to kill the poor thing," she said, "and I nearly died with the — you know — what you have to do with them. But then I was all right."

Princeps, New Venus, July 6, 2209. Planetary Food and Drug Administrator Harling today warned that he will "proceed to the courts" in all cases wherein sandrats are sold contrary to law. Administrator Harling added that he will prosecute offenders "vigorously, to the full extent of the enforcement resources at my disposal."

Princeps, New Venus, July 8, 2209. The Planetary Food and Drug Administration today released results of chemical analysis of the sandrat digestive tract, by an independent analytical laboratory "of recognized standing". No cause for protection against dehydration was found.

Bonedry, New Venus, July 10, 2209. The bodies of two Planetary Food and Drug Administration field agents were found near here this morning. Evidence seems to show that the two PFADA agents

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shot each other in a gun battle. Cause of the fight is not known.

South Bonescorch Junction, New Venus, July 14, 2209. A PFADA agent was found dead in the wreckage of his sand-buggy this morning. Evidence thus far uncovered appears to indicate that the sand-buggy's engine exploded.

Slag Hills, New Venus, July 19, 2209. The body of a PFADA field agent found here the day before yesterday was today shipped back to Princeps. Cause of death was a large bullet hole in the left chest.

Princeps, New Venus, July 20, 2209. PFADA administrator Harling today announced that enforcement of his sandrat-sales policy is being "temporarily suspended, pending completion of a massive public-education campaign."

Princeps, New Venus, July 22, 2209. Dr. Charles de P. Bancroff, Director-in-Chief of the Interscience Federation, today unveiled results of a new experiment "to determine the possible effects of sandrat ingestion." The intestinal tracts of sixteen sandrats, raised at the PFADA laboratories nearby, were "thoroughly macerated, divided into one hundred portions, and each weighed portion mixed with a weighed sample of a specific local plant. *In no instance was the proportion of water significantly increased by admixture with sandrat intestine.*" Dr. Bancroff stated: "I am amazed that superstition can persist in the face of repeated consistently negative experimental evidence."

Dry Hole, New Venus, July 28, 2209. Sixteen inmates of the Dry Hole Correctional Training Institute have disappeared in the last month. It is believed the prisoners are getting away as fast as they can catch sandrats. Owing to the isolated location of the Institute, and the local lack of surface water, it was never thought necessary to use an escape-proof outer wall.

Princeps, New Venus, I August 4, 2209. Officials of the Interscience Federation today announced new measures to "eradicate the sandrat superstition." A concerted effort will be made to coordinate teaching materials of all types, to render this superstition psychologically distasteful. Special mention was made of the trideo film, *Disaster in the Desert,* which, said a spokesman, "illustrates, step by step, the chain of causation leading from acceptance of the myth to the ultimate test, when the family sand-vehicle malfunctions in the desert. Then there is this

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distressing scene with the sandrats, and afterward we experience the deterioration of the family, physically and mentally, and the horror as they try to eat sunrustle stalks and other things of that type, and realize that they *don't* turn into water. We got Peter de Vianhof and Celeste Silsine for the principal characters — the stars of our show — and we think they've done a really superb and convincing job for us. It's one thing to just be *told* an old wives' tale is false. It's something else to actually *experience* it this way, right before your eyes." Another official stated, "We're going to pull out all the stops. We're going to crush this superstition."

V

Date: Frigidor 26, 2212
From: Presley Mark, President, New Earth Research
To: Col. J. J. Conrobert, C. O., Stilwell Base, New Earth
Subject: Dehydrated Water?

Con: Sorry this reply is late, but we've had a little trouble here. Some jackass greased the liquid air machine. Regarding your query as to whether there is any way to solidify water without freezing, I would certainly say, "No." But some vague memory keeps circulating through my mind.

What's your problem?

Date: Frigidor 27, 2212
From: J. J. Conrobert, C. O., Stilwell Base, New Earth
To: Presley Mark, President, New Earth Research
Subject: Outposts

Pres: The problem is, I've got eighteen detached observation posts in this freezebox, and supplying them is driving me nuts.

I've tried to explain through channels that these outposts serve no useful purpose, that anything incoming — aliens, bootleg spacecraft, planetary raiders, you name it — will show up on the screens. The generals tell me screens can be fooled and visual observation is a useful backup. That's that.

Well, we've got pretty rugged terrain. These observation posts are at high elevations, sunk into windswept crags overlooking wide sweeps of territory. We can't provision them from the air, because of dangerous winds and violently unpredictable meteorological conditions in general. We supply them *from the ground.* There's no vehicle or pack animal that can handle this. *We* do it. Every time we supply these outposts, it's like a battle. What gets us worst is water. In summer, it sloshes and shifts. In winter, the snow is contaminated by spores of the parasite of a solitary overgrown wolf that gets moisture by gulping snow. This parasite will infest humans, which complicates every-

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thing from the first snowfall to the middle of summer.

Yes, I realize waste can be purified, but kindly think over our budget, our conditions and the unscientific viewpoint of the troops.

Incidentally, I might add that this solitary powerful wolf finds our isolated snow-melting water-boiling shelters ideal for winter headquarters.

Now, these difficulties are samples. They don't exhaust the list. All these things interlock; you can't do this for one reason, or that for another reason. But if we could eliminate this water-delivery problem, with its complications of liquidity, freezing-point, spores, melt-houses, snow-wolves, *etc.*, it would simplify things enormously.

Could you work up some kind of gelatin, and when it cools it's a powder. Then when it's eaten, the water is released? Never mind if it weighs twice as much. We would gladly trade complications for some straightforward drudgery.

Date: Frigidore 29, 2212
From: Mark, New Earth Research
To: J. J. Conrobert, Stilwell
Subject: Nonliquid Non-Ice Water

Con: Am onto a weird track that may solve your problem — a discovery made on our sister planet. True to form, they ganged up on the discoverer, who showed some originality. Will let you know what I find out.

Date: September 16, 2212
From: Mark, New Earth Research
To: J. J. Conrobert, Stilwell
Subject: Waterless Water

Con: My investigations into New Venus "science" disclose that there is a creature there called a "sandrat" that lives on dry stalks while the other creatures sleep out the hot weather. For years, the local people have known this, and it appears that someone, stranded without water, decided that if he ate the creature, maybe he could do it, too.

Obviously, this couldn't work. But he tried it, and it *did* work.

Our experiments show that, in this particular animal's digestive system, there's a culture of microorganisms that breaks down cellulose. These microorganisms are passed on from generation to generation, when the mother sandrat feeds the baby pre-chewed food.

When the human eats the sandrat, the human's digestive juices naturally tend to kill the microorganisms. But the human is hoping against hope that he too can now process dried weeds and make water out of them. He

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promptly chokes down dried weed. The microorganisms go to work on it and produce among other things, a kind of porous charcoal dust, and water. The cellulose, you see, is $(C_6H_{10}O_5)$, or $[C_6(H_2O)_5]$, provided you remember the hydrogen and oxygen are not actually joined as water to form a hydrate. The microorganism takes care of this problem. Don't ask me how just yet. It will take us a while to figure this out. But here is your dry water, if you don't mind the weight penalty.

Evidently, the New Venus authorities fed their laboratory sandrats on starchy food and water. This microorganism, for some reason, doesn't like starch, and dies for lack of cellulose. Hence, their experiments demonstrated that the actual facts were imaginary. By means of a propaganda campaign, they rammed this revelation down the throats of the populace. Nice, eh?

To get back to our problem, we've tried cultures of the microorganism and find they will work on sawdust, amongst other forms of cellulose. Am sending cultures and live sandrats for your own use.

Don't know if this solves your problem, but it's a start. Incidentally, we find we get the best results with the raw digestive tract of the sandrat. Let me know how military discipline solves this problem.

We are also interested to see how New Venus "science" will explain the dilemma created by our report. We are releasing it in a special way.

Rathbone, New Venus, II August 16, 2212. Quincy Cathcart, a seed salesman here, today made public the text of a communication from Dr. C. J. Horowitz, Director of Research at the prestigious New Earth Research Corporation. Dr. Horowitz's message reads, in part:

". . . We wish to publicly acknowledge the prior date of your investigations into this important matter and to acknowledge further that your conclusions have been found to be entirely accurate.

"Owing to your researches, our efforts have been greatly facilitated.

"Mr. Presley Mark, President of the Corporation, has suggested your name for our Mark Medal and accompanying cash award. As you may know, this prize has not been awarded for three years, so that the award money has accumulated. We will be in touch . . ."

Princeps, New Venus, II August 18, 2212. P. L. Sneel, spokesman for the Legal Staff Section of

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the Interscience Federation, today warned that Quincy Cathcart, Rathbone seed salesman, "cannot legally accept any payment, emolument, reward, prize, or other recompense for performance of services which he is legally debarred from rendering. Under Sections 223, 224, and 226, Cathcart must refuse such payment or suffer the full legal penalties."

Rathbone, New Venus, II August 20, 2212. J. Harrington Savage, prominent Princeps attorney visiting at the home of Dr. Quincy Cathcart, today announced that "this allegation of the Legal Staff Section of the Interscience Federation is in violation of Section 6, which specifically prohibits ex *post facto* laws. Dr. Cathcart may be rewarded, to any extent and without limitation, for *past* services, rendered at a time when his outstanding qualifications were fully accredited. Any attempt of the Interscience Federation to enforce this ruling will be met with legal action on whatever scale may prove necessary."

Princeps, New Venus, August 22, 2212. R. J. Rocklash, of the law firm of Savage and Rocklash, today announced that he represents the relatives of one hundred sixty-two exposure victims lost in desert localities. Mr. Rocklash charges, "These people are victims of the propaganda of the Interscience Federation, which struck from their hands the obvious remedy and thus killed them."

Princeps, New Venus, II August 23, 2212. P. L. Sneel, of the Interscience Federation's legal staff, revealed today that the Federation, "as a gesture of reconciliation toward a former colleague fallen from grace," will not insist that Quincy Cathcart refuse payment for past services; "but Cathcart must be exceedingly careful to remember that he is debarred from undertaking to render any services, now or in the future, for which he is professionally disqualified."

Rathbone, New Venus, August 24, 2212. J. Harrington Savage, attorney for Dr. Quincy Cathcart, today warned the Interscience Federation that, "no gesture of reconciliation has any legal standing whatever in this matter. The Interscience Federation statement of II August 23, 2212 presupposes that the Federation may grant or withhold prosecution as an act of favoritism. This calls into question the propriety of Federation policy and its legal validity under sections 66, 67, and 68, governing the relations of governmental authorities and the citizens of New Venus. We are examining the very

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serious implications of this statement. If need be, a broad legal attack will be instituted to crush the evils inherent in such arbitrary and unprincipled behavior."

Princeps, New Venus, II August 26, 2212. Byron T. Fisher, well known popular author, arrived here today on the spaceliner *Queen of Space*. Mr. Fisher has come "to do research on my new book, *The Martyrs and Tyrants of Science*."

Dry Hole, New Venus, II August 29, 2212. Three tourists stumbled out of the desert here at first light this morning and attributed their safe arrival to "sandrats and chalaqui weed." They displayed official Interscience Federation Tourist Guide pamphlets warning that "the quaint belief that ingestion of sandrats digestive organs will obviate the need for water is simply an old wives' tale. Scientific experimentation demonstrates that the sandrat is as dependent upon liquid water as any other creature." All three tourists stated that this pamphlet was what nearly killed them.

Princeps, New Venus, September 6, 2212. In chaotic sessions of the governing bodies of the Interscience Federation the following actions were today taken: Dr. Charles de P. Bancroft stepped down as Director-in-Chief, citing reasons of health. By unanimous vote, the Committee on Accreditation reversed its former decree, to restore the full qualifications of Dr. Quincy Cathcart, former Chief of Medical Services. The Committee on Professional Conduct narrowly defeated a motion to overturn its formal rebuke of Dr. Cathcart, whose name, however, was returned to the active roster. In a further upheaval, the Legal Staff Section was drastically overhauled. So far, the Board has proved unable to select a successor to Dr. Bancroff, and is reportedly split into violent factions.

Princeps, New Venus, September 8, 2212. Dr. Sherrington Shiel was today named Director-General of the Interscience Federation. Dr. Charles de P. Bancroff resigned from the Board of Directors, to become head of a special Internal Procedures Study Group. Dr. Shiel's elevation vacated the post of Chief of Medical Services, and the Personnel and Appointments Committee unanimously approved Dr. Cathcart as Chief of Medical Services. An inside observer who asked not to be identified observed that, "Now we have Justice. Whether we get Truth out of it remains to be seen."

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Date: September 12, 2212
From: Quincy Cathcart, Chief of Medical Services
To: Philip Baumgartner, Medical Outpost 116
Subject: Reassignment
Recode: 121MCm116-1

Sir: Owing to retirements and promotions, the position of Director of Redrust Medical Center is now open. If you wish to accept this position let me know at your earliest convenience. I appreciate that you may encounter some difficulty in leaving your present post until the rains subside, in view of the surrounding bowl-shaped terrain. As I recall, the station has waterproof seals, and a cable-and-drum device to allow it to float up off its skids. I trust you have kept the cable well greased.

Date: Ocnovdec 26, 2212
From: Quincy Cathcart, Chief of Medical Services
To: Robert Howland, Director, Kalahell Conv. Dist.
Subject: Science Wipes Out Superstition
Recode: 121MCkc-1

Sir: I quote, for your edification, the following from the newly published Pamphlet 2P-103 of the Interscience Federation Press, titled, *Rusty Learns About Biotechnology*:

"Yes, Rusty, for years people died in the desert, when a plentiful supply of water was as near as the nearest vegetation — dry and useless though it seemed. At that time, the organized research facilities of the Interscience Federation had not yet created Biaqua. But there *was* a way — by ingestion of certain internal organs of the common sandrat—to avoid the more harmful effects of extreme solar exposure."

"Gee, Doctor! Didn't the people know about it?"

No, Rusty. Opinion Research instituted in April, 2211, showed that 92.65% of persons responding believed ingestion of the internal organs of the sandrat would have *no* effect on dehydration; 4.17% believed it might have *some* effect; 2.49% did not mark their ballots correctly; and only 0.69% believed it would *prevent* dehydration, and most of these lived in primitive outlying regions and believed it purely on the basis of superstition and folklore.

"Today, we instruct all travelers to carry Biaqua, and in emergency to overcome their squeamishness and rely on this simple biotechnological means of obtaining water from dry plant tissues . . . ."

Pamphlet 2P-103 goes on in this vein for many pages.

Incidentally, I have informed the New Earth Research Corporation that you carried out the

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first formal experiments on this subject. The credit belongs to you, not me.

Date: Ocnovdec 28, 2212
From: Robert Howland, Director, Kalahell Conv. Dist.
To: Quincy Cathcart, Chief of Medical Services
Subject: Sandrats
Recode 121mcKC-2

Sir: No, you are the one who risked your neck. Anyway, it appears to me the credit would ultimately go to Desert Bill, but how do you get it to him?

If you'd like to do something for me, I am chronically short of trained personnel. As you recall, some time ago, one of my converter technicians, Sam Mathews, turned up at Redrust Medical Center, tried to explain the plain truth and finally decided that if he was going to be thought nuts, he'd be nuts in the most profitable way. He is still enjoying a free vacation at Lakes Central.

Not long ago, one of my assistants went there on business and had a talk with Mathews. Mathews complains that when he goes to bed at night, the cot seems to be bobbing up and down. He walks with a rolling gait, as if he had spent his life on the water. A Dr. Tchnudi, who is analyzing him, is trying to get at his basic subconscious mechanisms, and he is straining Mathews's powers of invention. Mathews thus has hydrotherapy coming out of his ears, and he hungers and thirsts after some place where he can "look anywhere, and not see more than one canteen of water at a time."

I hope you will take care of this, as I have just the spot for him.

Ocnovdec 30, 2212
Cathcart to Roberts
121MCkc-3

Sir: I am happy to say that Tchnudi willingly let go of Mathews, stating that he believed he, Tchnudi, had effected a complete cure. Mathews is on his way back to you, and if you will just hang him up for a week or so and let the water drain out, I imagine he will be all right.

Meanwhile Tchnudi, elated over the "cure," is elaborating his sessions with Mathews into a gigantic tome that doubtless will make his reputation, will very possibly found a school of thought and perhaps make him "immortal."

This Mathews case has certainly been illustrative of the continuing conquest of uninformed prejudice by the rational forces of science.

The only trouble is, there are times when it's a little hard to tell which is which.

— CHRISTOPHER ANVIL

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GALAXY'S STARS

H. (for Horace) L. (for Leo) Gold is not only a writer of considerable stature in science fiction and fantasy, he is one who has a special relation to this particular science-fiction magazine. He started it. From its first issue, eighteen years ago this month, until the end of 1960, it was Horace Gold who set the policies, developed the writers and achieved the remarkable level of quality which made *Galaxy* the most-anthologized magazine of the past two decades.

By 1950 Gold was already a veteran of more than twenty years in the field. He began writing science fiction under the pen name of "Clyde Crane Campbell," but it was under his own name that such famous stories as *None But Lucifer, Trouble with Water, A Matter of Form* and many others were published. When he left the editorship of *Galaxy* for health reasons, he continued writing; now he lives near Los Angeles, with his wife and young daughter, Sheryl. His son, Eugene Gold, is also his collaborator, at least at such times as young Gold can spare time from his full-time career as a photographer.

Larry S. Todd, whose *The Warbots* marks his first appearance in *Galaxy*, is no stranger to our companion magazine, *If*. (He was represented there last month with a memorable novelette, *Flesh and the Iron*.) An undergraduate at Syracuse University (a veritable hotbed of science fiction activity; cover artist Vaughn Bodé and writer Richard Wilson are also to be found there), Todd both writes and illustrates his own stories.

Sidney Van Scyoc, the wife of an Air Force pilot, appeared a number of times in *Galaxy*, a few years ago. But her literary career was interrupted by the exigencies of childbearing and rearing; now that the children are a

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little older she is back with us with *A Visit to Cleveland General.*

Kris Neville, whose *Thyre Planet* is in this issue, is a native of the red-dirt south, now transplanted to Los Angeles, where he resides with his comely wife, Lillian, and the first installments of a family of young Nevilles. Budda-like and unshakable, Neville is a familiar presence at West Coast science-fiction gatherings. So is Larry Niven, newest of the "Big Name" science-fiction writers. Niven's first story was published in *If* three years ago. Since then he has achieved several dozen printed stories, at least three books (and more coming) and a Hugo for his *If* short story, *Neutron Star,* at last year's science-fiction convention. *All the Myriad Ways* is another of his excursions into the shorter lengths of fiction; *The Organleggers,* a short novel coming up in a near-future issue of *Galaxy,* is more typical of his work. There's a story behind *All the Myriad Ways.* For some time, *Galaxy* has been sponsoring a series of interdisciplinary gatherings between scientists and science-fiction writers, all over the United States. Through this informal "invisible college" science-fiction writers have visited Cape Kennedy, the Harvard Observatory, various research facilities at M.I.T. and elsewhere in the fields of computer design and nuclear physics, meetings of scientific groups in New York, Washington and California, etc. Niven, along with *Galaxy* contributor Fritz Leiber and *Galaxy* editor Frederik Pohl, was present at the Jet Propulsion Laboratories last October, on the day when Mariner V telemetered back its findings on its successful fly-by of Venus — hence this story.

Incidentally, what make these meetings between scientists and science-fiction writers productive is a sort of reciprocal sharing of interests. A good many scientists are science-fiction fans; a good many science-fiction writers are fans of science. Some people, of course, are both; but it seems to be true that a fair percentage of science-fiction writers keep themselves informed about what's happening in cosmology, molecular biology, decision theory and all of the other marches of science not so much out of professional interest, or even in the hope of being able to use the material in stories, as for pleasure. Scientists (and science-fiction writer) who are interested in participating in such sessions in the future, please note.

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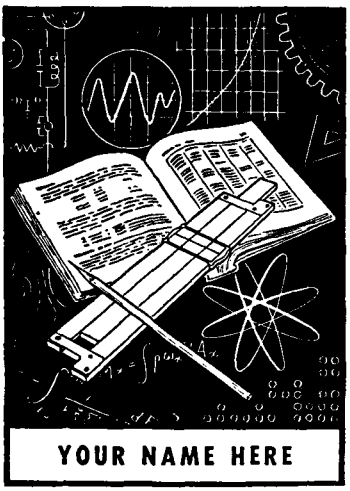

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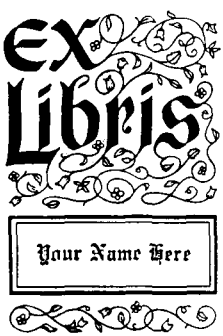

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